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BOSTON JOURNAL OF COMMERCE AND TEXTILE INDUSTRIES and SOUTHERN MILLS.

Devoted to the Manufacture of Textiles.

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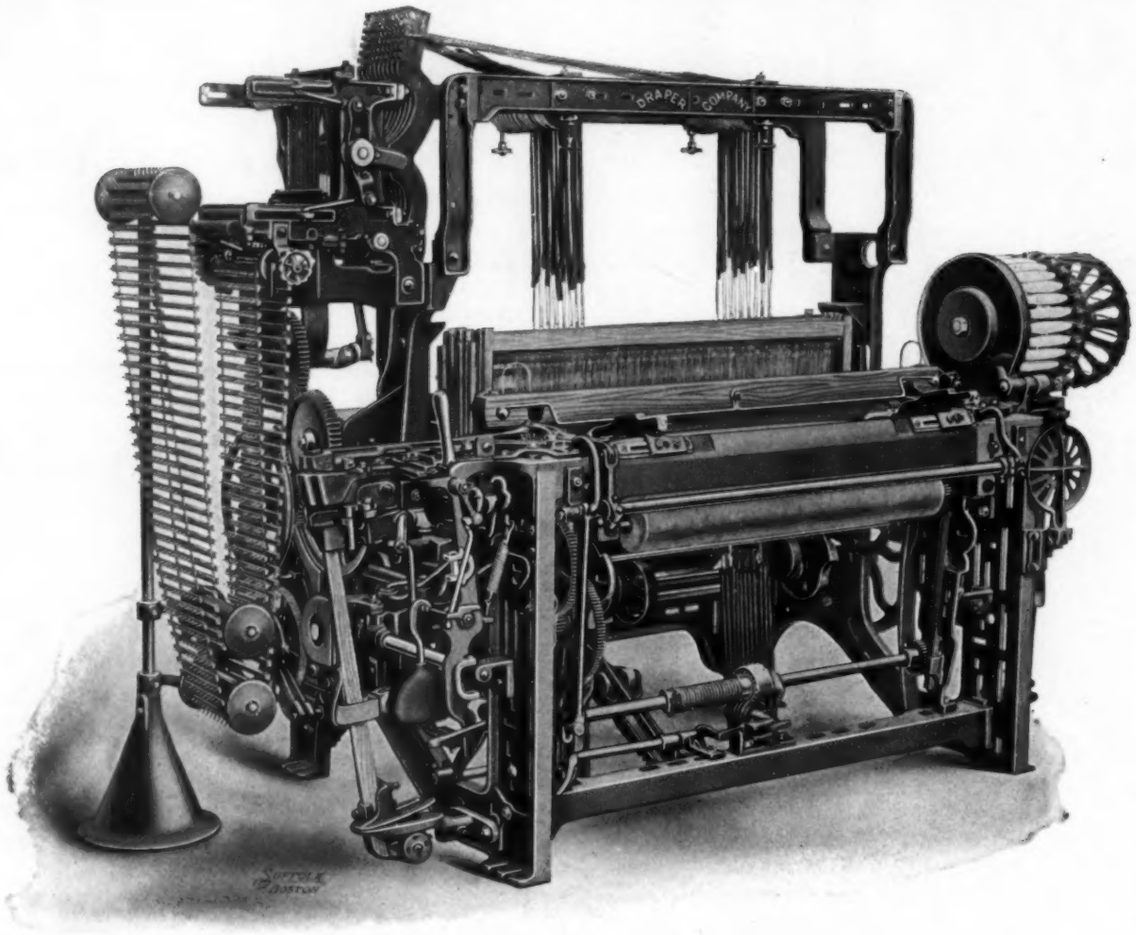

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A NEW ERA IN TRANSPORTATION AGENCIES.

Truck horses are becoming so expensive, and their maintenance so costly that cotton manufacturers are confronted with the very serious problem of mill yard transportation. When the automobile became popular for pleasure purposes and light city trucking, the sooth-sayer proclaimed far and near that horse flesh would depreciate greatly because of the operations of the laws of supply and demand. "There would be a clear case of no market for horses; overproduction of horses, and one could buy a horse at his own price."

The actual operations of the Automobile versus Horse situation have been a constantly increasing cost for the equine as production decreased. The horse raiser read the signs of the times and decreased production until to-day the market price for a good pleasure horse or a light worker is nearly double that of ten years ago. Governor Draper of Massachusetts apologized for a slight delay in reaching the annual meeting of the National Association of Cotton Manufacturers held at Boston recently, by saying that he had purchased a horse just a few minutes before the hour for the meeting and the price paid nearly ruined him. He said that in the New England States horses were selling for double the price of six to eight years ago.

As a transportation factor the horse is disappearing in the mill yards of New England and the middle Atlantic States. One of the largest cotton mill corporations in New England has displaced 26 horses with three motor vehicle trucks and reduced the cost of mill yard transportation over one-half. The immense barns for the housing of the horses, the storage barns for wagons and trucks, the hay and grain barns and sheds, the harness rooms, the forges and numerous other equine appurtenances have been replaced with a cement garage 30 x 100 ft., with a large part of the garage available for future requirements in the motor vehicle line. The agent of this mill stated that the motor vehicle system of mill yard transportation was thoroughly successful and adaptable to the smaller textile plants.

Modern competition requires economy in every department in the manufacture of cotton yarns or fabrics; it requires greater efficiency in every detail connected with the industry and it requires less manual labor. In the earlier days of cotton manufacture, when competition was in an embryonic state, the mill yard transportation question had little or no bearing upon the issues of economy, efficiency or expediency of filling orders; but to-day conditions are more exacting. The slow plodding yoke of oxen can no longer be used to haul the raw materials or the finished products, because they are entirely inadequate to meet modern conditions. In the transportation department there has been as much evolution as in any other department of the industry. The side track, the spur, and the switch are all modern institutions of industrial transportation; and now the laws of supply and demand, augmented by the requirements of competition, are forcing the horse out of the mill yard and replacing him with the motor vehicle truck.

The advantages of motor vehicles for mill yard transportation are manifestly greater than those of horse and trucks. All of the requirements of modern competition are met by the motor truck in the mill yard. Instead o brute force for the transfer of heavy weights, we have the lightning subdued by the brain of man and harnessed by the generator and motor or the carburetor blending with mathematical accuracy the gasoline and air into a dynamic vapor ready to do our bidding better, quicker, cheaper and without the unhygienic conditions which surround the stable and the horse.

The Pepperell Mills, Biddeford, Me., use motor trucks exclusively in the mill yards, and the following table illustrates forcibly the advantages of this form of mill yard transportation:

TEAMING.

Total cost for 5 years	$33,419.49
(Not including hired teams for mill coal.)	
Of which, the labor of drivers and helpers was	24,961.77
Leaving as cost of grain, shoeing, harness repairs, horse renewals	8,457.72
As this is for 10 horses for five years, cost per horse per year was	$ 169.17

ELECTRIC TRUCK.

Cost complete, including battery, etc.	$ 3,400.00
Estimated cost of charging equipment, to charge 3 trucks	250.00
Spare parts, in case of accident	350.00
Amount invested in electric truck, etc.	$ 4,000.00
For comparison with horses, deduct estimated value of 4 horses, carts, etc.	1,000.00
Excess amount invested	$ 3,000.00

EXPENSES OF TRUCK PER YEAR.

Interest on investment at 6 per cent.	$ 180.00
Depreciation, 10 per cent. (batteries and tires below)	310.00
Batteries, $207. Tires, $235. (Each to run one year)	442.00
Two men to operate truck, one at $1.75, one at $1.25	900.00
Cost to operate truck one year	$ 1,832.00
On the basis of five years cost of teaming, tne displacing of 4 horses, four men on double teams would be	
4 horses at $169.17 per horse	$ 676.68
4 men at same rates as above	1,800.00
Total	$ 2,476.68
Less	1,832.00
Saving per year by the use of one truck	$ 644.68

The Pepperell Mills have about 40 water wheels on their corporation and at the head gates where there is more or less leakage, they put in a wheel and a dynamo to charge the batteries over night so that the cost of charging is practically nothing.

At the Amoskeag Mills, Manchester, N. H., motor trucks are used on grades up to 14.7 per cent. and frequently loads of one ton are transported over such grades. The Amoskeag trucks are used for mill yard as well as city work and have displaced a herd of horses. The operating cost is very much less than that for horses, and there is greater efficiency. The Pacific Mills, Lawrence, Mass., make a report similar to the Pepperell, and use the motor trucks extensively for mill yard as well as city work. The electric vehicles are used very largely in Lawrence because water power is available for charging during the nights when the mills are idle.

For the trackless transportation of freight there is no competitor of the motor truck. Just as the electric trolley car solved the problems of city passenger transportation, so the motor truck has solved the problem of mill-yard transportation. The three factors affecting mill-yard transportation are the road, the load and the vehicle. The former must be accepted as it exists, while the load can be modified slightly. The vehicle must be either horses or mechanical for the ancient yoke of oxen can not be considered a factor, although there are a number of mills in the South that are still using this form of transportation. If horses, there are the objections enumerated above; if mechanical and trackless there is either the electric motor truck or the gasoline truck. The capacity is variable and the power a matter of selection. Accurate engineering should be applied to the existing transportation conditions so that a vehicle with the required capacity and power can be selected.

In other branches of industry motor trucks are used very successfully. Steel and iron works use this method of transportation almost exclusively. Breweries all over the country use motor trucks for transportation of raw materials and for the delivery of heavy barrels and casks of the finished product. Wholesale coal dealers in New York City, Boston, Philadelphia and other large cities use trucks with a capacity of three to six tons. And so one might enumerate users of motor truck vehicles until nearly every industry and business requiring heavy trucking had been covered.

STABILITY OF COTTON MILL SHARES.

It is most gratifying to those interested in the textile industry to note the marked stability of textile mill shares in all of the markets. There has been no heavy liquidation in shares that are listed on the exchanges, such as American Woolen preferred and common, Amoskeag Mills and New England Cotton Yarn, and price movements have been practically nominal. Issues sold recently at public auctions in Boston, New York and the South have displayed, as a whole, creditable firmness. Brokers making a specialty of cotton mill shares are frank to admit a scarcity at all times of the seasoned stocks with the demand far exceeding the supply.

Such a condition is a barometer of the textile industry that is most valuable and reliable at this time. As indicated in previous editorials we believe that the textile industry in this country is on the verge of a tremendous economic advance, and when the signal for "full speed ahead" is given, financiers and investers will be the dynamic force. The creditable showing now being made by these shares can not but create confidence and interest in this class of investment securities, which has been sadly neglected up to within a few years. Of course, some of the seasoned textile shares in New England, such as Pepperell and Bates, have sold off slightly; but when the large pre-

mium at which these shares are selling is considered it is not at all unreasonable to expect a price recession of from $315 per share to $300 on one transaction of five shares of Pepperell. The day this sale occurred it was extremely stormy in Boston and there were only three investers present. The recession of Bates from $260 to $257 is not worth explaining. Androscoggin Mills' stock was bid up to $241 per share for two shares which were badly wanted to even up an odd block held by an estate. During the past month this stock fell back to $205, or the exact price previous to the two-share lot sale.

New Bedford shares hold firm at the highest prices with no offerings, while Fall River issues have suffered to a greater extent than any other group in the country. Fall River mill shares are always held quite largely by brokers in that city who do an "over the counter" business, so that in times of depression the reaction is more acute in that city than elsewhere. Southern mill shares have not experienced any great reaction; in fact, dealers in those issues are extremely optimistic and appear unwilling to sacrifice a mere fraction to create sales. Such an exhibition of stability is remarkable when one considers that it is generally admitted and known that current dividends are not being earned, and amounts required for dividend purposes are either taken from surpluses or considered in anticipation of probable profits next year. The investing public know that profits for this year are not large enough to make customary dividend disbursements and yet they are willing to accept a portion of the dividend from surplus account instead of unloading this stock.

Could such a situation possibly exist in railroad or general listed industrial stocks? As an illustration: Edwin Hawley's road, Chicago & Alton R. R., is not earning dividend requirements, and it is entirely probable that the dividend in Alton stock will be reduced or passed. Wall Street has thoroughly discounted such an action by a price decline of 40 per cent. of the selling price when the full dividend was being earned. Toledo, St. Louis & Western, an allied road, has dropped in value from $70 per share to $48 per share because its 4 per cent. dividends may not be earned if Alton reduces or passes its dividend. This is the way Wall Street discounts adverse financial conditions in the railroad shares market. Both of these issues are closely held by investors who have been selling their holdings heavily for several months.

If investors in textile mill shares did not consider that this was an unusual year in the textile industry and merely an incident in the march of prosperity and progress of this great manufacturing business, there would be demoralization of the financial departments of all mills whose shares are held by the investing public. With courage and confidence for another three months, investors in cotton mill shares will be amply rewarded for their patience and the industry will mark time for an upward movement in dividends and price quotations.

COURT UPHOLDS SOUTH CAROLINA COTTON TARE ACT.

Especial importance attaches to the decision handed down last month by Judge DeVore in the South Carolina courts upholding the constitutionality of the cotton tare act of South Carolina, which was passed by the Legislature of that State this year. The South Carolina law makes it a misdemeanor to deduct for tare, unless its weight exceeds 6 per cent. of the gross weight of the bale; in other words, a tare allowance of 30 pounds to the bale is permissible, and which must be paid for by the consumer as cotton. The usual allowance for tare is 20 pounds to the bale. The subject of tare on cotton bales was explained thoroughly in an address by President John A. Law, of the Saxon Mills, Spartanburg, S. C., at the recent meeting of the American Cotton Manufacturers' Association at Charlotte, N. C. President Law predicted that an early test case would be made.

The test case upon which the decision of Judge DeVore was given involved two points, namely, that the act of the Legislature deprived the defendant of the equal protection of the law; that the act of the Legislature deprived the defendant of his liberty and property without due process of law. In handing down his opinion on the first point the Judge said:

"It is well settled that the Legislature has a right to make different classes and so long as all members of the same class are treated alike, if the classification be reasonable, the courts will not declare such legislation unconstitutional."

Citing a case, Judge DeVore concludes: "The defendant being engaged in the business of buying cotton comes within the classificaion made by the Legislature, and in my opinion is not deprived of the equal protection of the law."

On the second point the Judge said that the test seemed to be whether the regulations of the Legislature are reasonable. "If they are unreasonable," he said, "then such legislation is unconstitutional; if they are reasonable then in the exercise of its police power the Legislature has the right to enact the law. In the absence of a statute on the subject the reasonableness of a contract is a question for the judiciary, but if there is legislation on the subject and the Legislature had the power to pass such a law, then the statute controls."

After citing several cases the Judge concluded: "The cotton buyers and cotton sellers differ as to the amount of bagging and ties that should be placed on a bale of cotton. The Legislature intervened and established a scale of cotton tare, and so far as I am able to judge, the Legislature is reasonable.

Cotton is one of the chief products of this State. There are a great many persons and a great deal of property and a number of organizations engaged in the cotton business.

What the tare is in this State, what it is in Liverpool, or what it is in New York, are no matters for this court to consider. This court will presume that the Legislature took into consideration the conditions controlling the marketing of cotton and enacted the proper law regarding the tare. But this is not a new question in this State. A law fixing tare on cotton seems to have been enacted as far back as 1846. Cotton buyers have a great many customers, many of whom are ignorant, and I can readily see how such legislation as this may be both wise and beneficial."

It is understood that the case will be appealed to the Supreme Court of the State. The question is of vital importance to the manufacturers of the State, as the additional tare means an extra expense of from $1.00 to $1.50 a bale to the mill, and as South Carolina uses about 700,000 bales a year it will be seen that the loss to the mills will amount to over $1,000 000 with 15 cent cotton.

Southern Textile Association.

On Saturday, July 2nd, the Southern Textile Association held its second meeting of the year at Lakeview Park, Augusta, Ga., where over 350 members and visitors gathered to attend the sessions in that delightfully cool and beautiful park.

Many of the members arrived in the city on the preceding day and found plenty of time to renew acquaintances and meet the new members who were coming into the Association. It was found on Friday night that 70 new members had been added to the enrollment previous to the regular Saturday convention. That this Association has found a responsive chord with superintendents and overseers in the Southern textile field was manifested more than ever by the large attendance at the sessions and by the great number of new members joining the Association. The local committee on arrangements, headed by Superintendent Arthur T. Smith, of the Langley (S. C.) Mfg. Co.,

W. P. Hamrick, Newly Elected President.

had made excellent arrangements for the meeting and for the pleasure of those in attendance. The headquarters of the Association were made at the Chamber of Commerce building, where new members were enrolled and all received membership buttons and badges, and cards to the barbecue. At 12 o'clock the members assembled in front of the Chamber and boarded the cars for Lakeview Park, accompanied by the brass band from the Langley Mills.

The business session was held at 12:30 at the Casino in the Park. This building was delightfully cool, due to the large number of electric fans operating and to the semi-open construction of the hall. President Chas. F. McCall, Greenville, S. C., called the meeting to order, and prayer was offered by Rev. H. T. Tree. The Langley band occupied the back of the stage, and the regular convention business was interspersed with lively airs. A. B. Blackshear delivered the keys of the city to the Association in a very appropriate speech. Mr. Blackhear said that he would not undertake to "spin a yarn of welcome," but in the name of Augusta he welcomed the members to the city and invited them to spend, not just the week end in the city, but to live there forever if they so desired. He said the city realized the advantages of having such trained men in her midst to carry on the great industry of cotton manufacturing, and with such men at the head of the industry in the South, future prosperity of this section is established.

L. W. Redd, superintendent of Lexington Mfg. Co., Lexington, S. C., responded in behalf of the Association. He said that although he had been away from Augusta for 25 years, the city was still near to his heart, as his career in the cotton industry began in that section. Mr. Redd said that he began his career in the cotton mill as a boy and was in the Graniteville Mills in 1886, where he worked under T. H. Rennie, who is now president of the Pell City (Ala.) Cotton Mills. Mr. Redd paid a beautiful compliment to Mr. Rennie for the assistance given him to advance himself in the cotton industry, and from the earnestness of these words it was plain to be seen how deeply this early assistance was appreciated. Mr. Redd stated that when he left Graniteville to go to Greenville he left some boys behind, and he was glad to know that many of them had climbed to the top rounds on the ladder of success. He said that he believed no man ever left Graniteville or Augusta but who made good.

President McCall then addressed the meeting, in which he expressed the appreciation of the Association for the cordiality extended the Association by the city of Augusta. In speaking of the inception and organization of the Association, Mr. McCall reviewed briefly the history of the body from the time a few men met together at Spray, N. C., two years ago with the idea of forming an association for superintendents and overseers of cotton mills, up to the present. These few members decided to advertise to the superintendents and overseers of the South that a permanent organization would be formed and they invited them to join the Association. He said that the success of the movement could be judged better when it was stated that within the short life of the Association over 450 members

Arthur T. Smith, First Vice-President.

have been enrolled. In discussing the advantages of conventions, Mr. McCall said that they meant a great deal to all who attended, as the practical papers read gave excellent ideas in a practical manner, and the personal acquaintanceship of these men who have the practical operation of the mill in charge will undoubtedly bring about a closer re-

E. E. BOWEN, SECOND VICE-PRESIDENT.

lationship and co-operation in matters that affect them as a whole. He asked the members not to be stingy with the information they had relative to cotton manufacturing, but to give and receive ideas relating to the industry, which would be of benefit to all.

J. H. Bagwell, overseer of weaving, Chadwick-Hoskins Mill No. 1, Charlotte, N. C., then read an interesting paper on "The Weave Room and the Preparatory Processes" after which the meeting adjourned to have the convention photograph taken, and to partake of the barbecue which had been arranged for in one of the park pavilions.

It is estimated that fully 350 members and guests were seated at the five long tables in the pavilion, which presented a most animated scene when the members were seated. The large shade trees afforded splendid opportunity for the members to enjoy the fresh air and scenery after the dinner, in fact the allurement of the restful surroundings was so great that the attendance at the afternoon session suffered in consequence.

The afternoon session began at 3:30 with a paper on "The Spinning Room" by W. M. Sherard, superintendent Jackson Mills, Iva, S. C. This was followed by an address on "The Little Things in a Mill" by S. Hampton Smith, Augusta, Ga. The final paper of the afternoon session was delivered by Richard C. Thomas, Southern representative of the Joseph Sykes Bros., Charlotte, N. C., on "Cotton Carding."

EVENING SESSION.

The evening session was a happy combination of a smoker and meeting at which many interesting papers were delivered and business of the Association transacted, including the election of officers. The session convened at 8:30, the first address being "The Card Room" by W. J. McDonald, superintendent Walton Mills, Monroe, Ga. The Langley band was on hand and added much to the enjoyment of the members by the rendition of popular airs through the evening.

The next paper read was on "Welfare Work in Mill Villages" by W. A. Giles, superintendent of Graniteville (S. C.) Cotton Mills, after which Otis G. Lynch, the veteran cotton manufacturer of Augusta, was called upon for a speech on "The Early Days of Cotton Manufacturing." Owing to Mr. Lynch's failing eyesight, he asked J. H. Flythe, agent of the Seaboard Air Line Railroad, to read his address.

President McCall then stated that the meeting was open for business and called upon resolutions. Henry W. Atkinson, Editor of COTTON, Atlanta, Ga., presented a resolution that a vote of thanks be extended to the mill people of Augusta, the arrangement committee and the Augusta Chamber of Commerce for their efforts, which had made the Augusta meeting such a great success. David Clark, treasurer of the Association, moved that a stipend of $5.00 per month be allowed the secretary, due to the increased duties of that office in connection with the large enrollment of members. G. S. Escott, assistant secretary of the Association, suggested that the number of meetings in a year be changed from three to two, the meetings to be held on the nearest Saturday to Thanksgiving Day and the nearest Saturday to the Fourth of July. All of the resolutions were adopted.

Mr. Escott read an invitation from Charlotte, N. C., asking the Association to hold the next convention in that city. The invitation was accepted, and the next meeting will, therefore, be held there on Saturday, November 26th.

T. M. MCENTIRE, THIRD VICE-PRESIDENT.

A telegram was received from W. P. Hamrick, the first vice-president, stating that his absence from the meeting was due to illness.

It was decided to hold an open election of officers, the nominations for the different offices to be made from the floor. Four men were balloted on for the four offices of vice-president, the nominee receiving the largest number of votes being first vice-president and so on down to the fourth vice-president. The following officers were elected:

President—W. P. Hamrick, superintendent Olympia Mills, Columbia, S. C.

1st vice-president—Arthur T. Smith, superintendent Langley Mfg. Co., Langley, S. C.

2nd vice-president—E. E. Bowen, overseer of weaving, Great Falls Mfg. Co., Rockingham, N. C.

GROUP OF MEMBERS AT THE MEETING OF THE SOUTHERN TEXTILE ASSOCIATION, AUGUSTA, GA., JULY 2, 1910.

3rd vice-president—T. M. McEntire, superintendent Loray Mills, Gastonia, N. C.

4th vice-president—M. E. Stevens, superintendent Columbus Mfg. Co., Columbus, Ga.

Secretary—G. S. Escott, Editor "Mill News," Charlotte, N. C.

Treasurer—David Clark, Editor "Textile Manufacturer," Charlotte, N. C.

The new members elected to the board of directors in place of four members whose terms expired are M. G. Stone, general superintendent of Pacolet Mills, Spartanburg, S. C., chairman of the board; S. B. Rhea, master mechanic Monaghan Mills, Greenville, S. C., Geo. F. Lynch, superintendent Enterprise Mfg. Co., Augusta, Ga., T. R. Hazel, overseer of spinning, Olympia Mills, Columbia, S. C., and W. H. Hardeman, overseer weaving, Newberry (S. C.) Cotton Mills.

On the motion of W. A. Giles, Otis G. Lynch, whom Mr. Giles styled the dean of the Southern textile manufacturers, was elected an honorary life member of the Association.

The secretary's report showed that on June 30th there were 377 members of the Association, and in the few days previous to the meeting about 200 members were added to the list, making a total of 577 members.

THE WEAVE ROOM AND THE PREPARATORY PROCESSES.

BY J. H. BAGWELL, OVERSEER WEAVING, CHADWICK-HOSKINS MILL NO. 1, CHARLOTTE, N. C.

When we write about preparation of work for weaving we must touch on the other departments of the mill, viz.: Carding, spinning, spooling, warping and slashing.

I think it is a mistaken idea some people have that the cheaper they get the work through the preparatory department, the lower the cost will be on the finished product. It should not be a question of how cheap we get it through the preparatory departments, but how good. The tendency of a great many overseers and superintendents is to rush the work through these departments, and it seems that their one great object is to get a large number of pounds through at a low cost, without enough attention being given to the quality of the product. You can rush it through these departments, but when this is done to such an extent as to be detrimental to the running of the yarn in the weave room, the rushing process makes a sudden stop and all the bad work and defects show up; with the result, you have a low per cent. of production with a high production of seconds, and a very poor quality of cloth throughout, and a cost that is unreasonable.

If we stop and think that the cost of weaving in most cases more than equals the cost of carding and spinning, and besides 95 per cent. of the bad work that is made in a well-regulated weave room can be traced directly to some defect in the preparation and that with a little extra effort on the part of the carder and spinner these defects could be greatly reduced at practically no extra cost to these respective rooms, the weaving production would be greatly increased and the total cost of production reduced. The weaver must make the very best cloth possible, which is at its best not what it should be at all times, and the weaver is often blamed for not producing quality and quantity when the fault lies with the preparers.

We come to the card room, and the first requisite to good carding is good mixing, and this usually being done by hand, should be as large and as thorough a mixing as possible. This is the most vital and opportune time to even up the stock that will ever occur. It can not be accomplished in any subsequent process; this is one of the most important processes of the card room, and one to which too

M. E. STEVENS, FOURTH VICE-PRESIDENT.

little attention is given. This defect can not be remedied at any subsequent machine, and one of the characteristics of good yarn is evenness. This is dependent upon the successful manipulation of the cotton in all of the processes which it undergoes.

Special attention should be given the drawing and fly frames to see that the top rolls are in perfect condition at all times and not grooved, or cut, or uneven, or dry at the bearings, or weighted too little, or too much. The clearer boards should often be picked of clearer waste from the speeders, to prevent lumps being run in the roving. The overseer should require the frame hands to be careful in piecing up to prevent hard ends, for when this roving goes to the spinning room, if the roving is cut or uneven it is going to cause bad work in the spinning, and anything that will cause bad spinning multiplies the bad work for the weaving. With a little care and watchfulness, these things can be practically eliminated without any noticeable extra cost to the carding, but it will increase the production and decrease the cost of weaving.

From the spinning and spooler rooms comes the lumps, gouts, big and long knots, which cause the weaver so much trouble; and we all very well know what these mean in the weave room. At least 90 per cent. of the bad work in the weaving is caused by a gout or lump on the yarn. A spinner, to make good yarn, should always be on the lookout for bad work and try to keep the lumps and gouts out of the yarn; for a few days' run of warp yarn in the spinning room will last for months in the weave room, and the final cost through the loss of production, and defective work, would stagger the man in the office if he could trace it up. As the familiar saying is, an "ounce of prevention is better than a pound of cure." The overseer and spinner of to-day do not twist an end together when it breaks down, but they dab it up, thereby making a gout or lump on the yarn, and when the work runs a little tough the gouts and lumps increase. The overseer should require the spinners to make small piecings and keep the frames clean; scavinger rolls should be looked after, especially those that are worn out at the ends, for if an end breaks down there the cotton soon gets around the journal of the roller and makes more gouts.

SPOOLING.

An extra effort should be made to clean the yarn of as many of the imperfections as possible at the spooler. To do this may add a little to the cost of the spooling, that is, more than we would like to pay, and it would necessitate more piecing up, but it is better to piece up there than later on. Some mills do not regard this with sufficient consideration and try to remove and improve things in the weave room that should be taken out and improved in the other departments. A lump or a gout will cause a bad place to be made in the cloth if not detected before it strikes the reed. This must be picked out by the weaver if not too long, which means that loom must stand from 15 to 45 minutes; this is a loss to both weaver and company. If it is let go to the cloth room it must go in seconds, and possibly from 15 to 30 yards of good cloth with it, which is still a greater loss to the company. If the guides were set on the spooler to break the yarn at these places, it would be much easier and cheaper in the end to piece up that end there than to pick out three or four inches in the weave room. To increase our production both in quantity and quality there should be more attention given the spooling.

Next we come to the warpers, and if the warper tender is not a careful operator we get high and low selvages and

J. H. BAGWELL.

loose ends, which mean a decrease in the production and an increase of the waste and cost in the weaving. In the slashing we can improve poor yarn to a certain extent, and ruin the best yarn that was ever made; and right here the production of the weaving can be greatly increased and the waste and cost account can be greatly reduced. A hard or soft sized warp means extra cost and waste and no end of trouble to the weaving. We should select a starch and a

compound suitable for the style of goods being woven and when we get the desired results, cut out experimenting. In making a fine grade of goods, having a large number of picks per inch, the yarn should be stronger and a greater amount of skill is required in sizing the warp. A point to be emphasized is, that about one-half of the weaving is done in the preparation of the warp, for no amount of skill expended afterwards will produce good work. If the slasher tender allows his machine to stop an undue length of time, the size is cooked on the yarn; and if he carelessly allows the size to become thin it is impossible to expect good results from a poorly sized warp.

DRAWING-IN.

In the drawing-in of warps in some mills very little attention is given this department, and it is no uncommon thing to see a warp cut out of a loom on account of bad harnesses and reeds. This means extra cost and a lot of unnecessary waste and a loss of production in the weaving. The harnesses and reeds should be carefully inspected before being drawn. Harnesses are often cast aside, whereas with a little repairing they could be made almost as good as new. By giving the harnesses the proper amount of attention before being drawn, a fixer can start a warp in less time and save the weaver the piecing and drawing-in of many ends. The fixers should be required to use care in tying-in warps, for a great amount of yarn and cloth may be wasted by carelessness of loom fixers in tying-in warps. The lack of care and attention of the harness in the drawing-in room is the cause of many pieces of cloth costing twice as much as they should cost, besides causing endless trouble in the weave room.

THE WEAVE ROOM.

Next we come to the weave room proper, where the dividends are made or lost, and the mill's reputation as well. In weaving there are many kinds of looms and in buying a loom a great deal more depends upon its build than is generally taken into consideration. At the present time the demand for such diversity of cloth necessitates much changing. In buying a loom these things should not be overlooked. There are looms which will weave the best of plain cloth, but which are not adaptable to the weaving of drills and other heavier and fancier weaves, without a great deal of expense in changing over. A loom should be bought which is adaptable, as far as possible, to a wide range of weaves.

Another point in looms is the harness motion or cams. Too little attention is given these parts in view of what is expected of them. On some cloths a very little dwell of the harnesses is necessary, while others require more. I have seen mills having trouble in their weaving, and the superintendent and overseer were after the carder and spinner for bad work when their trouble was in the shape of the cams on their looms. If the shape of the cams is not considered when changing from one class of goods to the other, that is, in point of coarseness or fineness or yarns, the results are very apt to be disastrous.

There is a fast and a slow motion of the lay which is absolutely necessary for the formation of good solid cloth. It is the uneven motion which gives to this part of the weaving the name of "beating-up." If the motions were equal, the filling would simply be laid in, consequently the cloth would be loose and open. There is an impression with some that the slowing down of the lay is caused by the pick motion, but this is a mistake. The pick motion which is fixed to give a hard blow will tend to check the lay, but this is the result of faulty fixing.

The pick motion is a very important device and the overseer and fixer should see that it is giving the best results for the power expended. It is a very easy matter for the pick motions to be so fixed that the loom requires a great deal more horsepower to run it than would be necessary if the motions were correctly set. Some fixers believe that the uneven movement of the lay is caused by the pick motion, and it may be a fact that through faulty setting of the pick motions the movement of the lay is checked, but if the motions are understood, together with the reasons for the shapes of its various points, there can be little or no check of the lay. The placing of the hand on the reed cap is one of the best ways to tell whether or not the motions are working at their best.

The setting of the shed is another important part of good weaving and should be given the attention due to it, for a greater or smaller number of picks can be put in the cloth, according to the way in which the harnesses are set. With the shed level when the reed is from 2 to 4 inches from the fell of the cloth, the shed is more open when the beating-up takes place, consequently the picks are held more firmly in the cloth and are beaten up closer and there is only one pick to beat up at a time; but when the shed is not so open, the picks are not held firmly and spring back, so that the lay has to beat up several at one time; this makes it impossible to have as heavy a cloth as in the former case.

HUMIDITY.

While the sizing compound is used to lay the fibers of the yarn to a greater or lesser extent, the necessity of drying the yarn before it passes on to the beam takes out the natural moisture from the yarn, causing it to be more or less brittle and destroying somewhat the elasticity of the yarn. To condition and bring back the warp yarn as near to natural conditions as possible, so that the production may be the best both in quantity and quality, the room must be kept in such a condition that there will be sufficient moisture in the air to penetrate the size on the yarn and strengthen it to stand the work it has to do. The humidity naturally affects the production of the room, and the loss of production also means a poorer quality of production; and we might say that the trouble does not end here, for it is impossible for the help to use the same energy when the air is dry as when a fair amount of moisture is in the air. Many become rundown, careworn and careless because the room is not properly moistened and ventilated. This is a point that is more or less neglected in most all mills, but it should not be, and the efficiency of a weave room depends largely upon what thought and attention is given the above points.

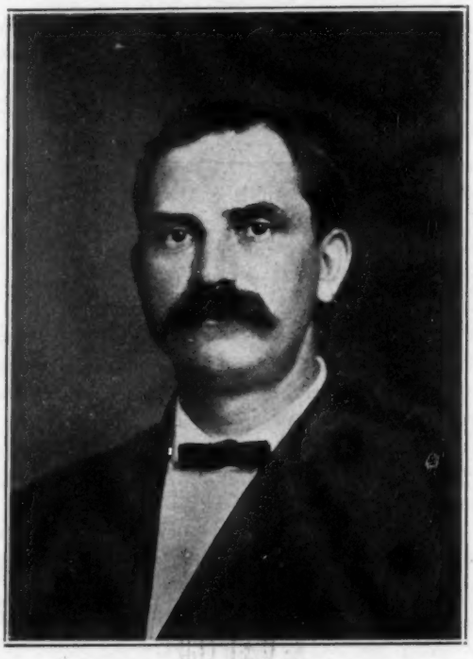
Again, the face or cover of the cloth is not generally looked after as it should be. This apparently small matter does not receive the attention it should, but it can be unhesitatingly stated that a cloth with a good face or cover is of a greater value than a bare, ordinary piece of cloth, though both may be of the same structure Whether the cloth is to be printed on one side, napped on one side, or sold as gray goods, its value will be increased because the printed figure will show up better, the nap or fuzz will be longer, and the cloth will be more pleasing to the eye and touch when the buyer examines it.

THE SPINNING ROOM.

BY W. M. SHERARD, SUPT. JACKSON MILLS, IVA, S. C.

Spinning, the second process in the manufacturing plant, is one of the most important, and it largely determines the character of the finished product. It is a fact, well known among practical mill men, that a large percentage of the bad work produced in the spinning room is directly traceable to inferior work in the carding department.

I shall endeavor to give some of the causes for making bad work or uneven yarn in the spinning department, and also some practical remedies for overcoming troubles of this kind. First, the spinning frames must be properly lined and leveled, and the spindles correctly set to produce good work from a fair quality of roving. There are many



W. M. SHERARD.

causes for making bad work in the spinning department, even with first-class roving, and I shall enumerate only those that are most common to the average spinner. The creels at times become sagged or out of line, and this causes skewers to extend too far through the creel-boards, and at times to come in contact with roving or loose bobbins on the board. The skewers will then drag and stretch the roving, causing uneven yarn. The creels should be so adjusted that skewers will extend only about one-fourth of an inch into creel-board. There are times when the skewers become worn at the point, and trimming or polishing usually makes the points more delicate. One of the best remedies to overcome this trouble is to either replace them with new skewers or use small round-head tacks driven in the ends of skewers. This will also cause less friction.

Another cause of uneven yarn is that the roving trumpets at times become clogged with loose lint or other matter, and the roving will stretch and finally break back from the rolls.

There is probably more bad work caused by rolls than any other one thing in the spinning room . A roll is not necessarily bad, simply because of its worn condition, as there are in many instances rolls direct from the shops that cause bad work. Sometimes it is because of inferior workmanship, and also at times from an inferior class of material used in covering the rolls. The roving carriage at times is not properly adjusted, causing the stroke to vary from one-fourth to three-eighths of an inch, and too much lost motion on the change, allowing the sliver to remain at one point too long; this will cause uneven yarn.

The setting of rolls is another very important matter, and they should be adjusted according to the length of the staple of cotton used. The average grade of Upland cotton will vary from seven-eighths to one and one-sixteenth of an inch, and the front and middle rolls should be set about one inch between centers. Rolls when set too close will cause cockle yarn, and when too open will cause it to be weak and uneven. It is a difficult matter to adjust the rolls and get satisfactory results when using two different grades of cotton together. In instances of this kind, the rolls should be adjusted for the shorter staple, and the weights on the middle roll released. This can be done by slipping the bottom saddle onto the back rolls, which will prevent cockle yarn.

The setting and plumbing of spindles is another very important matter, and the alert spinner will not lose sight of this fact. Spindles frequently get out of plumb, causing too much friction on the yarn. The spindles should be set directly in the center of the ring, and the guide-wires should also be properly set to obtain satisfactory results. To avoid friction on the yarn, the ring-rail should be lined and leveled with the spindle-rail.

Too much care can not be exercised in the selection of travelers. The weight and style of travelers will of course depend on the number of yarn, size of rings, length of traverse and the space of the spindles, to obtain the best results. It is good business judgment as well as economy to use a standard make of traveler, and also to use as light a traveler as possible and at the same time prevent the lashing together of the yarns when the ring-rail is at its lowest point.

Spindles frequently run badly for want of oil, and I might also state that an inferior grade of oil is oftentimes largely responsible for troubles of this kind. It is economy to use a good grade of oil, and spindles should be oiled about every eight or ten days. Fast motion parts of frames should be oiled regularly once each day, and the parts running at less speed should be oiled two to three times every week. Weight levers should be adjusted so as not to rest on the creel-boards. It is important that all gears be correctly set, that is, neither too deep nor too shallow, because carelessness in either event will cause friction. Cleanliness should be one of the first requisites in mill work as well as in any other vocation.

Fabrica Rink, the largest woolen mill in Rio de Janeiro, and the only one of consequence in the district, now operating 1,200 spindles and 104 looms, will shortly make new installations, bringing the total up to 1,900 spindles and 132 looms. Electrical installations have been ordered and the factory will be operated entirely by electric power. About the same time installation will have been made in the only one of the cotton mills of the Federal district which remains to adopt electric motive power. The total installations in the nine mills amount to about 10,000 H. P.

THE LITTLE THINGS IN A MILL.

BY S. HAMPTON SMITH, AUGUSTA, GA.

It seems particularly apropos at this time to give special attention to what the writer desires to term "the little things in a mill," for often it is by closest attention to the little things that success may be obtained.

If the main shaft of a mill should break, all the skill and energy at the command of the mill necessary to put it in good condition again would be dispatched to make the required repairs, so that the mill might be started to run again with as little lost time as possible. This is something of such importance that it does not escape the attention of any one, and it is realized that all the machinery represents thousands of dollars of capital on which interest must be paid, as well as to meet the other fixed expenses of salaries, taxes, insurance, etc. Yet perhaps in that same mill a shaft may not be broken, but some little thing or a number of them is being overlooked from day to day and which gradually eats into the profits each day until those profits are turned into losses. It may be due to careless or insufficient attention to oiling, for example, which only takes time to eat up profits through the expense and supply accounts of having to replace the worn-out parts of the machine.

And so the writer offers this paper touching upon the little things that come up in everyday mill life, affecting expense and supplies, production and its cost, and will give a few definite illustrations or examples that have actually occurred and of which he personally knows. Some of these cases have to do with increasing the efficiency of the help, some with the question of supplies, some with the machinery. But in a paper of this kind these examples must necessarily be limited to a very few.

In one of our large Southern mills it was noticed in the card room that on all of the cards, the belts driving the licker-in wore out and had to be replaced often enough to make quite an item in belting. A close inspection revealed the fact that the edge of the licker-in belt in passing around the cylinder pulley brushed close enough to the cylinder stand to become slightly sponged in each revolution with the accumulation of oil and lint underneath the cylinder bearing. Of course it is well known that a belt will wear out much quicker when it is allowed to become more or less saturated with the lubricating oil of the machinery. The card hands and card grinders were accordingly instructed to give particular attention to keeping this accumulation of lint and oil removed from underneath the cylinder bearings. The result was, the belts lasted two and three times as long as they did previously.

Now let us look at a little thing that occurred in a mill with less than 10,000 spindles and which operated towards a loss for that mill. This mill was making 3.25-yard sheeting for export to China, but when the Chinese boycott came on the orders for this weight of sheeting were discontinued, and so the mill had to turn to making four-yard sheeting for the domestic trade. On account of the requirements of the orders for the four-yard goods, large shipments had to begin by a certain time. Also the shipments to China on the 3.25-yard goods had to be completed by a specified time. There was ample time to complete the shipments on the old order and to begin shipments on the new order, provided the changing over of the mill from one kind to the other, was made along at the proper time and in the proper proportion.

Calculating approximately the amount of goods in process through the mill on the old order, it could be easily determined what was the amount that still had to be produced to complete this order. But a changing over can not be completed in a day throughout the mill and make the necessary amount of goods come out even. In this case nearly the entire machinery of the mill was continued on the 3.25-yard goods for the old order and then began the changing over, only as the old warps had run out within a few days of time to begin shipments on the new order for the four-yard goods. It was necessary, of course, that enough looms should be kept running on the 3.25-yard sheeting to get this order completed in time required to prevent it being cancelled.

It had been suggested that in the last few weeks the looms were running on the 3.25-yard goods that the loom beams could be filled only half full, and if necessary refill them to half full again a few times over. In this way the same full production from all the looms could be obtained in time to wind up this order and then have plenty of time to start on the new order. The objection to this plan was that the drawing-in of the extra half-filled beams would be an extra expense to the mill, but when it was completed and shipped on the required time there was still a quantity of these 3.25-yard warps not yet run out, that had to be woven. The result was there was a large quantity of the 3.25-yard sheeting left on hand over and above the order and for which the mill had absolutely no sale. These left-over goods, amounting to over $1,000, were afterwards sold at a loss. It is interesting to note that the extra amount necessary to pay the drawing-in hands for drawing in the extra number of half-filled beams would not have amounted to over $50. So for the saving of the little item of $50 the mill lost several times that amount.

These periods of dullness in cotton manufacturing should be turned to advantage and should be opportunities to give special attention to the little things. It should be a time for the mill man to give his attention towards putting the machinery, as far as possible, into the same condition as when it was new, to improve his working force here and there, to get as high quality and as large a production as possible at a reasonable cost, remembering that production is always valued according to its cost.

He should remember that in the long run he is measured not so much by his week of big production as by his week of smallest and average production, not so much by the condition and operation of his newest and best machinery as by that of his oldest machinery; not so much by the quantity and quality of work that he gets from his brightest and steadiest hands as by that from his worst hands. And so, by closest attention to the little things that come up every day in the mill our Southern mills may become more and more efficient, and just as Southern mills have already surpassed all the rest of the mills in this country, in the quantity of raw cotton manufactured, so should the quality be made better and better until we have placed the South where it naturally and rightfully belongs—the greatest world center of manufactured cotton goods.

Automobiles require about 290,000 bales annually for the manufacture of tires and about 35,000,000 pounds annually for the manufacture of leather seats and cushions.

COTTON CARDING.

BY RICHARD D. THOMAS, SOUTHERN REPRESENTATIVE
JOSEPH SYKES BROS., CHARLOTTE, N. C.

Before giving you the card settings, etc., I prefer first to mention the importance of the lap. When the lap is presented to the action of the card it has been, or should have been, cleaned and opened, although it has not been thoroughly freed from all impurities. The proportion of the latter, however, comparatively speaking, is not large, and with the improvements gradually taking place on the pickers, this trouble is yearly growing less. Owing to the methods in which the material has been dealt with in the earlier stages, it is not in a fit condition to be passed on to the drawing and spinning frames without first having gone through the card, there being in the lap a good many short fibers and "neps," the effective removal of which is absolutely essential to the production of good yarns. Thus the operation resolves itself into one of cleansing by the removal of any remaining motes, short fibers and "neps." It is often assumed that the fibers are laid in parallel order in the web produced in carding, but this is only affected to a very limited extent.

The most important question in my opinion is the condition of the lap prepared for carding. This subject does not receive the attention it deserves, as laps are often fed which are neither so well cleaned or so even in weight as they should be. It can not be too strongly insisted on that it is absolutely necessary for the success of a card that the lap when presented to it should be in as perfect condition as it is possible to get, and every impurity which can be expelled by the beating action of the picker should be eliminated. The only work to be thrown upon the card teeth should be the removal of short fibers and impurities, which, without breaking the fibers, can not be detached during picking. If the extreme delicacy of the fine points of the card clothing be borne in mind, it will be seen that to put upon them the task of removing heavy impurities is at once an error in principle and practice. Not only, however, should there be a perfectly clean lap, but should also be very even in weight. The means adopted in the picker for regulating the passage of the cotton so that thick places are taken out are absent in the card, and whatever may be the inequalities in the lap, no means are at hand by which they can be removed during carding, although they are, of course, reduced to a slight extent before it is coiled in the silver can.

The end of the lap is presented to the action of the licker-in teeth at a steady rate, and, if one part of the lap is thinner than another, fewer fibers will be removed during each revolution of the licker-in than when the thicker part is being presented to the same action. Consequently, during the time the cylinder is revolving the number of fibers presented to it varies according to the thickness of the lap. Assuming that the cylinder is charged with cotton, is it unreasonable to suppose that it will retain more fibers at one period than at another, and consequently that when these are transferred to the doffer the number on the surface of the doffer will vary in a like manner.

If the variations in the lap were great and prolonged, this point could be easily demonstrated, but as the difference in the thickness of the lap is at the present day not so great, and as the thin places are not of great length it is more difficult to trace their effects. Broadly speaking there is no doubt that the irregularities of the lap are reproduced in the card sliver. However, it is not a good thing to lay too much stress upon this argument, but it is necessary to emphasize the fact that an uneven lap can not possibly be an aid, and is no doubt an immense hindrance to the production of a regular card sliver.

THE FEED PLATE.

I will now dwell a little on the present feed plate. It has often been said that when setting the feed plate to the licker-in say to 5/1000, that the licker-in would have a tendency to destroy the fiber, but I can assure you that when the proper feed plate is used according to the length of the staple, it is impossible to set the feed plate too close, so long as you do not come in contact with the points of the licker-in. For instance, when using a ¾-inch staple the distance between the nip of the feed roller and the bite of the licker-in tooth is short, and when using 1-inch cotton, the feed plate is made so that the distance between the nip and the bite is greater; and when using 1¼-inch staple the distance is still greater, which enables each feed plate to be set the same distance from the licker-in without destroying the fiber.

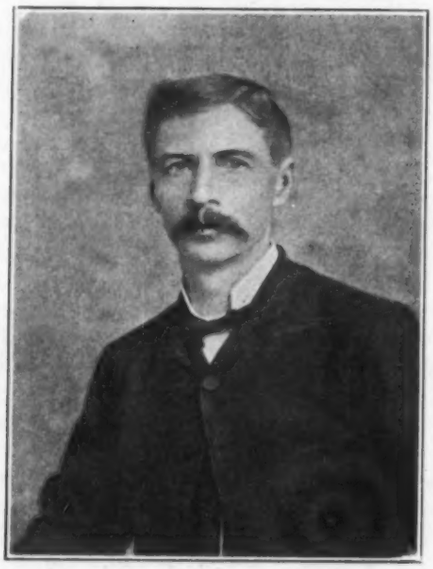
The action of the licker-in tooth is, indeed, one of extreme interest. There is a dual operation always going on, namely, a cleaning of the teeth and the manner in which they are set there is no danger of their becoming choked. When the points of the licker-in wire strike the projecting end of the lap they pass through it at such velocity that the heavy adherent impurities are struck down and partially removed. At the same time the teeth remove the fibers, which are sufficiently loosened. It is important to note that those fibers which are not so ready for detachment are simply divided and combed by the rapidly revolving teeth. Thus after a few revolutions of the licker-in the end of the lap is so far straightened and combed out that the removal of the fibers is much easier. Now it is obvious that the preparation of the end of the lap in the manner described would be much more difficult if so great a length of fiber projected beyond the nipping point that there was any likelihood of the cotton being removed in tufts or lumps of considerable size. This detailed or separate detachment of the fibers is aided by the feed plate, and when thoroughly carried out is of great importance in diminishing the work thrown on to the cylinder and flat teeth.

The full advantage of the present feed plate is only obtained when the surface, from which the fiber is struck, is specially shaped and made to suit the staple cotton which is being worked. When a short stapled cotton is being dealt with, the space between the inner face of the feed plate and the tips of the licker-in teeth is very small, and the projection of the fibers over the nose of the feed plate is immediately followed by the combing action of the teeth, which I have previously mentioned. When the staple of the cotton treated is longer, the extreme end of the fibers can be attacked at a greater distance from the nip of the feed roller, and, it being desirable to comb out the cotton as described, the nose of the feed plate is shaped to allow of this being done. The gradual and not the sudden detachment of the fibers is what is wanted, and to this end the action of the licker-in teeth in combing out the end of the lap is very useful. It must not be supposed, however, that in speaking of the detailed removal of the fibers it is

meant that they are struck from the end of the lap singly, because this is not the case. They are removed in numbers simultaneously, and, owing to the method of setting the teeth on the licker-in, the work of removal never ceases.

THE PRINCIPLES OF CARDING.

Assuming the fibers to have been delivered to the cylinder, it is desirable to get a clear understanding of the treatment they undergo before being finally stripped from the doffer. It is necessary to know something of the construction of the fiber itself to get a rational idea of its manipulation by a revolving flat card. The cotton fiber is possessed of a natural twist which causes it to endeavor to



G. S. ESCOTT, SECRETARY.

curl around any adjoining fiber, a tendency which makes it much more difficult to straighten. Even when it is drawn straight it requires little provocation to twist up again, and it is in this fact that much of the difficulty of carding is found.

A calculation, which can be readily made, will show that it is not necessary for the licker-in to feed sufficient cotton to the cylinder to enable the latter to be always taking up fibers. The number of teeth on the licker-in and cylinder and their respective velocities render it practically impossible for each point on the cylinder to take up at each revolution one fiber which it is theoretically supposed to do. Indeed, it is more than probable that there are considerable periods—that is, comparatively—during which the teeth in various parts of the cylinder do not take up any fibers at all. In short, there are not enough fibers to go around, and they will be held by the carding points in a practically free manner.

A properly made card tooth should only grip the fiber for a short distance, and the hold which it retains upon it will depend very largely on the "keen" point of the card tooth, that is to say, the angle of which it is bent between the foundation and the points. On this point I am strongly of the opinion that it would be fatal to efficient carding if the cylinder had taken up so many fibers that every tooth was charged; and that it is, when such condition is approached that a cylinder becomes overcharged and its work becomes bad. It is necessary that a certain freedom from restraint should be left to the fibers or otherwise they could not be effectively treated by the card flats; for it is obvious that if a fiber were embedded in a mash of others it could not be easily raised from the surface so as to be combed along its free portion. Herein lies at once the strength and weakness of carding. The strength is in the fact that the fiber can be readily drawn through the card teeth by the flats or can be easily lifted by them and cleaned. Unless this freedom existed, not only would the actual work of carding be badly done but there would be a considerable risk of the rupture or fracture of the fibers, owing to the excess of power required to detach them.

Now we take for instance when the card cylinder becomes faced up, it has naturally lost its carding qualities, and at once begins to load very heavy with a mass of cotton; and it is impossible to set the doffer close enough to free the cylinder of its load, which results in bad carding, generally very cloudy and neppy. There are several causes of this misfortune, such as getting the card flats too close to the points of the cylinder clothing or setting the doffer too close to the points of the cylinder; or it may happen where a card grinder will try to see how close he can set the back plate or front bottom plate, but in most cases I have personally found where this trouble has happened was through the cylinder screen at the back having been set in contact with the cylinder clothing to such an extent as to have ground holes completely through the under casing. I regret to say that too much of this close setting prevails in too many of our Southern mills.

CARD GRINDING AND SETTING.

As you are no doubt well aware, there is quite a difference in the grinding and setting of a new card to that of a card which has been working for a few years, and I will now proceed to give you my settings on the latter card, first placing myself in the card grinder's position. The first thing in the morning I walk around to see that all my cards are in working order. This being done I take out the feed of the card which I am to grind that day, and as soon as possible I have the cylinder and doffer stripped, again starting up the card to clean off all the flat strips. After this I would again strip my cylinder and doffer, after which I would brush out my cylinder and doffer by hand, then stop my card and clean it thoroughly. Then I would put on my traverse wheel grinders, carefully setting them at each end of the card with a No. 5/1000 gauge and start up my card, first setting the grinder to the cylinder so that I occasionally see a spark; then treat the doffer in the same manner. That being accomplished, I put on a cross belt to run the flats their regular way, and by doing so it prevents any accumulation of grinder dust or short fibers at the top edge of the stripper plate, and which is also a preventive from ignition.

Having gotten this card to grinding, I then proceed to re-set the card from which I recently took the grinders. I first take away my feed plate, then take the licker-in out, but not until after I have set it to the cylinder to 10/1000. Then I proceed to take out my cylinder under casing, having it thoroughly cleaned and polished either by whiting or black lead, then put the under casing back again, setting the back top edge at 34/1000, using 29/1000 to make sure it is not any closer. At the center I set exactly the same, but in the front of the casing—meaning the side nearest the doffer—I set this top edge 5/16-inch from the cylinder, as this is one place where the longest fibers are knocked

out and laid in under the doffer, should the casing at this point be set too close. I then see that my back plate is set to 24/1000, and as this plate on most cards is fastened to small concentric bends it is supposed to be set at the same distance at the top edge. We now put the licker-in in place, screwing down the caps of the licker-in bearings and again making sure that the licker-in is still set to No. 10 gauge.

We then proceed to set the licker-in under-casing which should always be set according to the production and quality of the carding, which varies anywhere from 34/1000 to 5/16-inch, but regardless of quantity or quality, it is absolutely necessary to set the mote knives as close to the points of the licker-in as possible without coming in contact. We now adjust the feed plate and set to the licker-in 7/1000, using a No. 5 gauge for clearance. We now proceed to the doffer which must be very carefully set. We first set the doffer to the cylinder to a No. 7 gauge; then turn the cylinder around slowly to find the very highest place, and then turn the doffer around slowly also to find the highest place and having got the two highest points on both cylinder and doffer together, we will then set to a No. 5. The same rule applies to both ends of the card for a distance of 18 inches from each end. We then set the front bottom plate to 34/1000 using 29/1000 for clearance the same applying to the lower edge of the flat stripper plate; then set the top edge according to the percentage of strips required, which is usually 3½ per cent. for coarse work, 5 per cent. for medium and 7 per cent. for fine carding.

We now proceed to set the fly-comb to 10/1000, using No. 7 gauge for clearance. After this we commence to set our flats. In the first place we will loosen or lower the support brackets, between the first and second, and second and third setting brackets on each side of the card. We then commence to set the flats at the center of the flexible on each side, for coarse or medium carding using 10/1000. Turn the same flat to the front setting brackets where we also set to 10/1000, then to the front support bracket where the same gauge is applied. From these the same flat is turned to No. 1 setting bracket, which is nearest the licker-in where we also set to 10/1000. Then carry the same flat to the back support bracket where we adjust the flexible in a light manner as before; then the same flat is turned back to No. 1 when it is often found that at this point the flat is further away than when we first set it, but we readjust it to 10/1000 and carry the flat back to the support bracket, making sure the setting is true. Apply the same to the center bracket, also to the front support bracket and to the No. 3 setting bracket, which is at the block shaft.

I would endeavor to have all the setting of the card completed before noon-time when I make it a practice to stay for a matter of five to ten minutes and turn the cylinder as fast as possible to make sure it is entirely free. Treating the doffer in a like manner. This work being accomplished the card is now ready for oiling, belting up and starting to work.

Tungsten salts are used in fireproofing cloth for curtains, draperies, etc.; in weighing silks; in glass making; as a mordant in dyeing; and for other purposes.

The imports of cotton piece goods into Bombay, India during 1909 amounted to 425,661,851 yards, valued at $24,636,846, against 640,091,513 yards, valued at $36,379,742, in 1908.

WELFARE WORK IN MILL VILLAGES.

BY W. A. GILES, SUPERINTENDENT OF GRANITEVILLE (S. C.) COTTON MILL.

I presume that I was requested to write a paper on this subject, not on account of any special fitness on my part, but simply because of the fact that the company which I represent is known to be active in that line of work. I shall, therefore, confine myself to the work that has been done at Graniteville, S. C., because I am better posted as to conditions there.

First of all, what is welfare work? My answer is: Anything that tends to uplift the working people by giving them broader views, more comfortable homes, and happier lives. The church and school are not usually considered as a part of welfare work, but as a matter of fact they are the very foundation of all work of this kind. But in view of the fact that there is scarcely a mill village in the South which is not in possession of both of these, my remarks will be confined to other classes of welfare work.

It may perhaps be of interest to state what we are doing at Graniteville, and this will give you an insight as to what may be accomplished. The most noticeable building in this connection is the Hickman Memorial Hall, which was erected by the stockholders of the Graniteville Mfg. Co. as a memorial to Hamilton H. Hickman, who for 33 years was its treasurer, and for 31 years its president and treasurer. This building contains on its first floor a well selected library of over 2,000 volumes, a reading room, a billiard room, a game room for ladies and one for men.

W. A. GILES.

On the second floor is a well equipped gymnasium, which can also be used for dancing.

We have portable chairs and a stage, and can seat over 500 people. In the basement there are shower baths, a swimming pool and bowling alleys; and the privileges of this building are absolutely free to all employees of the company. A librarian is on duty every afternoon during the week from four to eight o'clock, and it is surprising to know the number of books that are taken out and read by the people. We have frequent entertainments, such as a lyceum course and musicals, which are well patronized

and appreciated. At a recent musical entertainment over 700 were present. We have a brass band which is well trained, and which gives frequent concerts at the hall and in the village for the benefit of the people. The services of this band are frequently called for elsewhere.

We have an Industrial School which is under the supervision of the Presbyterians. It is in charge of a matron, a teacher and a trained nurse, and while this is not, strictly speaking, a part of our work, yet the company has been giving them all encouragement possible by furnishing suitable buildings. The trained nurse, however, is employed by the company and she is directly under the supervision of the superintendent. I believe that if I should be asked to select some one thing in welfare work that I considered the best, the trained nurse would be my selection, as she goes into the homes of all of the people, giving them the benefit of her experience, teaching them habits of cleanliness, instructing them how to nurse and care for those that are ill, and in serious cases taking active charge. The physicians inform me that the employment of this nurse is one of the best things our company has ever done. The other ladies teach a night school for those who can not attend the Academy, and also teach domestic science. The Episcopalians also have a Deaconess who is doing a good work in the village.

We also offer prizes each year for the best kept yards and premises, and we find that this is also a valuable part of our welfare work, for the habits of neatness thus engendered have clung to those who have competed for these prizes, and even those who do not compete are induced by contrast and example to keep their premises in good order. I can see a marked change for the better in the appearance of the yards in the town since these prizes were instituted. We furnish comfortable homes, and pure drinking water, and encourage in every way healthful sports and amusements. There is a good baseball team in the town, which, while not supported entirely by the company, receives liberal contributions from that source.

Our public schools are surpassed by none; there were enrolled this year over 400 pupils; and we have nine teachers. The company is always liberal in support of the school, and tries in every way to encourage the people to send their children. But we are much handicapped by the absence of a compulsory educational law, as there are many more children of the proper age who should be at school, but are not in attendance.

These are some of the things that we are doing in welfare work, and it may be asked why is it that the mill is spending so much money in this way, and is it really worth while? I unhesitatingly answer, yes. The cotton mills of the South have gathered around them a large number of people, and they are responsible for their well being. The lives of the mill people are at best monotonous, working in the mill from morning until night, day in and day out; and it is the duty of those who have them in charge to make their lives as little burdensome as possible by furnishing them with wholesome amusements and giving them advantages that they could not get otherwise. It makes them more loyal and better workers, better contented with their lot, and it will be found that those mills which pay more attention to work of this kind will have the best class of labor and more of it in times of stress.

COMPARISONS OF BELT, ROPE AND ELECTRIC DRIVES IN COTTON MILLS.

DISCUSSION OF THE RELATIVE MERITS OF GROUP AND INDIVIDUAL ELECTRIC DRIVES.

(*Contributed exclusively to* COTTON.)

BY HENRY DOCKER JACKSON.

PART II.

We have seen that the belt gradually replaced bevel gearing, and to a certain extent rope replaced the belt, each being used with the idea of reducing the operating cost and increasing the productive capacity of the mills thus showing a decidedly aggressive spirit. The American manufacturer has always been looking for anything that will tend to improve the operating efficiency of his plant, and having satisfied himself that any device has merit, he will at least try it. Such being the case, it was not unnatural that when electric motors reached the state of a practical mechanism, attempts were made to use them in the driving of cotton mills. The first motors installed were used simply to take the place of the belting between the engine and the main line shaft on each floor, with fair results, the power as a rule being supplied from some outside source, although in a few cases this power was supplied from the main engine of the plant.

With the usual progressive spirit, some manufacturers felt that, if one motor per floor was a good idea and had operated successfully, doing away with considerable friction and increasing to a certain extent the factory output, an additional gain might be made by still further increasing the number of motors. Some of them went to the same extreme as regarded the installation of their motors, as their predecessors had with the rope drive. There was no plant in this country upon which to base opinions or judgment, and besides no one knew exactly the power requirements of the individual machines, although some of the machines had been weighed by means of the power scale.

FIG. 1. FOUR SPINNING FRAMES DRIVEN BY EACH MOTOR.

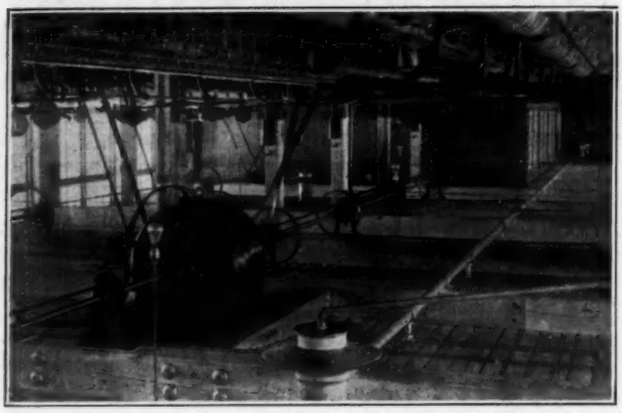


FIG. 2. MOTOR DIRECT CONNECTED TO LINE SHAFT IN CARD ROOM.

The great increase in speed and in the size of the apparatus has resulted in a considerable increase in the power in some cases, whereas refinements in the apparatus resulted in a considerable decrease in others.

The natural result with the more or less inefficient motors of that period was a decided increase rather than a decrease in the amount of power, and great increase in the maintenance and repair cost. Although there was a considerable increase in the production, it was not sufficient to pay for the losses in other ways, so that at that time at any rate the introduction of individual motors for the machines was a failure. This was due to a lack of knowledge of the power requirements of the different machines, a lack of knowledge of the characteristics of the electric motors, and comparatively speaking the poor efficiency of the small and moderate sized motors of those days.

In the early days, the larger motors were moderately efficient and gave fair satisfaction, so that those plants installed with a single motor driving a floor, gave good results and were a slight improvement over the belted drive. From this start began the steady inroad of the electric motor upon the cotton mill drive. With the increase in the efficiency of motors, engineers and manufacturers of electric motors began to push steadily the use of motors for mill purposes. They recommended as a rule the use of such sized motors as would give a good operating efficiency of the motor itself, and sub-divided the cotton machinery into such groups as these motors were capable of driving, thus increasing the number of motors and decreasing the sizes as largely as possible without lowering the ultimate motor efficiency or going to such extremes as to use too small a number of machines per motor. A careful study was made of the number of machines operating out of each group, so that the motor applied to the group had a full load capacity equivalent to the average load of the group. This resulted in a very large increase in the plant capacity, and through the reduction in the size of shafting, the number of belts, etc., the cost of the electrical installation was little if any larger than the equivalent capacity of a belt installation for new work.

It was soon found that motors of good efficiency could be had in sufficiently small powers to operate as few as four or five machines in a group, and such groups were tried. Fig. 1 illustrates a motor driving four spinning frames. Upon first trial, the results were not thoroughly satisfactory, due to the fact that the shutting down of any one of the machines removed a considerable proportion of the load from the motor, and the starting up of this machine resulted in a temporary slowing down of the motor, which affected seriously the quality of the material being turned out by the machines. There were two solutions of this vexing problem; one, by increasing the size of the motor and at the same time the number of machines operated by the motor; and the other, by decreasing the size of the motor and attaching one of these motors individually to each machine.

The first method meant an increase in the shafting and the number of belts with attendant friction losses which were not desirable, and first cost; and the second method meant an increase in first cost, but a considerable reduction in operating cost, and the entire elimination of belts and shafting. This made it possible for these machines to be installed without regard to other machines, and enabled the manufacturer to utilize the space in his mill to the best advantage. Certain machinery had had to be run by belts from underneath, as the overhead belts interfered to a very large extent with their proper operation. This being the case with belted drives, it was necessary to operate the machines from a shaft below the floor, bringing the belts up through holes in the floor to the driving shaft of the machine. This called for short belts in inaccessible places, and owing to the short centers and very tight belts,

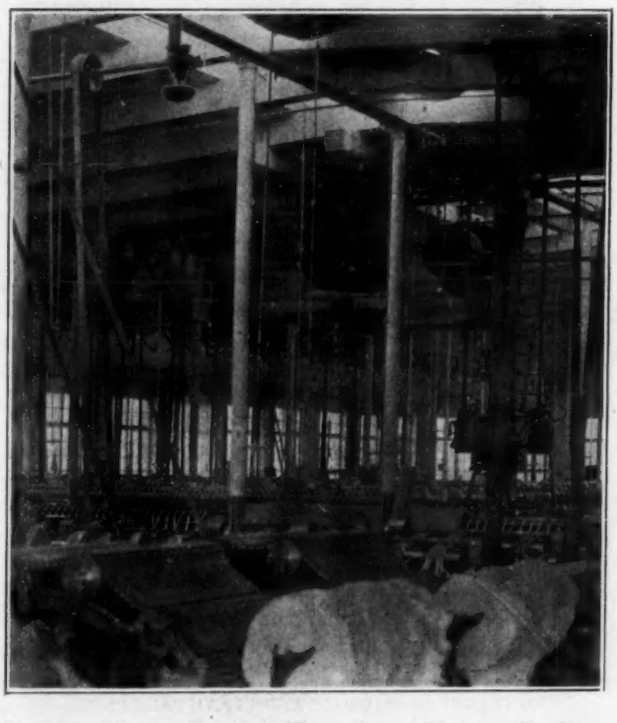


FIG. 3. MOTOR DRIVING TWO LINE SHAFTS THROUGH BELTS.

hot boxes and belt breakages were frequent. The use of individual motors for machines of this character increased to a considerable extent the output, and decreased the attention, and maintenance cost. There are a number of machines in a cotton mill which are particularly well adapted for the individual motor drive.

PRESENT USES OF MOTORS IN COTTON MILLS.

The usual layout for a cotton mill at the present time, using electric drive, is to have a motor direct connected

to a line shaft as shown in Fig. 2, or a motor with two pulleys, one on each end of the motor shaft as shown in Fig. 3, driving two line shafts and these shafts driving the machines by belts. The motors are large enough in size to be highly efficient; and if the drive from the shaft to the machines is laid out with care, allowing the proper number of machines so that the motor always works at or near its full capacity, the productive capacity of the plant may readily be kept at a maximum and the total efficiency of such a drive may be made very high. There is, however, a tendency in such drives to use belts which are too narrow, and not take all of the advantage possible of running the belts at an angle instead of vertical. In such situations there seems to be a possibility in the use of small ropes for driving purposes, thus obtaining the lack of slip which is inherent in a good rope drive and which is necessary for the best results as regards continuity and capacity of production.

The ideal layout for those mills where the owners are not believers in individual motors is the use of one motor driving two line shafts through belting from the motor to line shafts, the belting being figured on the basis of 35 pounds pull per inch of width on a double belt. This will insure a long life, small slip, slight stretch and little attention. The drives from the line shafts to the machines could most readily be made by means of small cotton rope attached to shifters, to change from the tight to the loose pulleys. This would result in the use of moderate sized pulleys for the belting, and not require extremely large pulleys for the rope drives. This would produce a drive exceedingly efficient as well as make a low operating cost.

FIG. 4. ENGINE ROOM WITH A TURBO GENERATING SET.

COMPARISONS OF GROUP AND INDIVIDUAL DRIVES.

The proper layout for group drive may be determined roughly by the following method: Compare the efficiency of operation of a number of machines being operated continuously by individual motors, with the efficiency of a number of machines being operated continuously through one large motor operating the line shaft, and from this shaft through belts or ropes to the various machines. If we consider that no friction exists in the shafting, and that there is no friction or slip in the pulleys or belting, the larger motor drive will show up as more efficient, owing to the difference in efficiency of the motor.

It is well known, however, that line shafting requires power for its operation, so that a certain percentage of the power should be subtracted from the large motor for the operation of this shaft. It is also true that there is a considerable loss of power in belt friction and slip, which must also be subtracted, and even if rope is used, the increased pull on the bearings due to the rope adds to the friction loss in the shafting, so that here, too, there must be an additional percentage subtracted from the larger motor. Having subtracted these two losses, the two efficiencies may again be compared, and under these circumstances it is more than likely to be found that the efficiency will be in favor of the smaller motor.

There are, however, other items to be considered. The difference in cost between the individual motor drive and that of the belted drive, including all of the necessary intermediate machinery, must be figured and charged against one or the other, and in addition there must be charged against the larger motor drive, a possibility of a loss of the total productive capacity of the machinery which is being operated by this motor, due to any accident to the motor. In other words the insurance factor must be taken into consideration. This being done, it is more than likely that the individual motors, unless of extremely small size, will show up to be the more satisfactory. This proves more and more true as the number of machines dependent on a single motor is increased, and also as the smaller motors are becoming more and more efficient and the cost of these motors is being reduced.

Further than this, the greatly improved appearance of the factory as shown in Fig. 2 is obtained, and also the reduction of stirred up air, dust, dirt, flying oil, etc., adds very greatly to the improved conditions in the factory, and undoubtedly has a bearing on the quality of the output. The moral effect on the employees of a fine-looking, well kept up plant is by no means to be ignored. The possibilities of arranging all of the machinery so that the stock can go through in a continuous progression without at any time retracing its path, is readily obtainable through the use of the electric motor.

It will be found in a belted plant that the necessity of arranging the shafting and belting in a way that is economical on the power side frequently prevents the laying out of the machinery so that this progression of the stock is easy to maintain. With the individual motor drives, there is noth-

ing to prevent the machinery being laid out to give the best results in productive capacity and proper progression of the product. The electric drive, therefore, allows of all of the floor space being used for manufacturing purposes, and greatly increases the possibility of continuous operation, as there is very little danger of any number of motors breaking down at the same time, and absolute continuity of operation can be maintained by the use of duplicate generating units, either one of which, if necessary, can be made sufficiently large to operate the entire plant through its overload capacity while running under ordinary conditions at good efficiency with both units in operation.

The power plant, either water power or steam, can be installed at any convenient point without regard to the location of the mill proper, thus enabling advantage to be taken of a locality where water may be obtained for condensing purposes and coal readily shipped directly into the coal hoppers. Any enlargement in the capacity of either power plant or mill can readily be made without interfering in any way with the operation of the existing mill. The location of the new mill will not have to be studied for the purpose of properly continuing the line shafting, belting, etc., so as to operate with the best efficiency.

The electric drive assures complete flexibility in the operation of the plant, as any part of the plant can be shut down or run as may be desired. The speed of the machinery will be much more uniform, as slip will be entirely eliminated. The efficiency of the transmission will be largely increased, as all of the power developed by the motor will be directly applied to the greater part of the machinery, and to all of the machinery if individual motors be installed. A greater output will be obtained, owing to the uniformity of the speed, and the machines always being driven at their maximum productive capacity. The maintenance cost will be reduced, owing to the reduction of belts and the low maintenance cost of the motors. The operation throughout the plant will be more convenient, as none of the groups in the case of group drive, or none of the machines in the case of individual drive, are dependent on each other.

The fire risk throughout the plant will be greatly reduced, as the possibility of fire from the motors themselves is negligible, and there are no possibilities of hot boxes or dangers of friction of the belts against the belt boxes from floor to floor, etc. The danger to the operatives will be very largely reduced, as there will be no belts for them to be caught in and no necessity for sending operatives to make repairs on overhead or underneath shafts. Also there will be very much less chance of a shut down, as an accident to any individual motor affects only the machines operated by that motor, and in some cases this itself may be avoided by the use of a belt temporarily operating two lines of shafting together and throwing the load on to one motor while the burned out motor is being repaired.

The general appearance of the entire plant, particularly the engine-room, will be neater and quieter, and the general maintenance cost of the entire plant, engine, etc., will be largely reduced. The modern motor has reached a point at the present time which will allow of individual motors on every machine and an operating efficiency far greater than was formerly obtained with a group drive. The first cost of the installation will probably be considerably greater than the group drive, but the final result will unquestionably be a decided improvement both in operating cost and maintenance.

NORTH CAROLINA COTTON MANUFACTURERS' ASSOCIATION.

The third annual convention of the North Carolina Cotton Manufacturers' Association was held in the assembly hall of the Colonial Club, Charlotte, N. C., on Thursday, June 16th, with about 60 members in attendance, representing approximately 2,000,000 spindles. The Association held morning and afternoon sessions, and much important business was transacted looking to the extension of the usefulness of the Association and its membership.

President R. M. Miller, Jr., laid before the Association a new plan of organization which constitutes the creation of sub-organizations to look after the diversified products of the different mills of the State. North Carolina is unique among the Southern States in its diversity of cotton mill products which are naturally influenced by different conditions, and it was upon this fact that President Miller based his new plan of organization. He suggested that the North Carolina Cotton Manufacturers Association continue as the parent organization and within it create sub-organizations as follows: Gray or white goods department, colored goods department, hard yarn spinners department, and knit goods department. The Association will have supervision over all matters affecting the general cotton mill industry, such as legislation, freight and traffic, coal buying and other items which apply to all of the mills in general. This plan was adopted, and the sub-organizations will have supervision over matters pertaining to their particular department, and each will work as a separate unit in the Association. The benefits to be derived from such an organization can be readily appreciated when it is explained that when a conference is advisable on some matter pertaining to a certain department, the members of that department will have the privilege of holding a meeting without requiring the presence of other manufacturers whose interests are in other departments.

The Association has been constantly growing and now has 163 mills holding membership, but it was proposed to enlarge the organization by admitting the Virginia mills to membership. This was advocated both as a means of strengthening the North Carolina Association, and also of giving the Virginia mills the benefit of association membership, as at present the State of Virginia has no such organization. A. A. Thompson, Raleigh, N. C., and second vice-president of the Association, made the motion that the by-laws be so amended as to allow membership to manufacturers of textile fabrics in Virginia.

President Miller brought to the attention of the Association the Carolina Mill Rules, and asked the members to empower him with authority to approve the rules which are being revised by committees from the North Carolina Association and the South Carolina Association. The power to approve the report was immediately given to President Miller.

A resolution was adopted condemning manipulation and speculation on the cotton exchanges as follows:

"Resolved: (1) That this association records its entire approval of the resolutions adopted at the meeting held in May last, of the American Cotton Manufacturers' Asso-

ciation, with reference to cotton exchanges, and the abuses thereon.

"(2) That whilst recognizing the advantages of these exchanges where their rules and methods of operation are such as to make the prices of contracts upon them representative of spot prices and condition, we deplore the fact that the rules of the New York cotton exchange, at least, at the present time, are such as to encourage speculation and manipulation of prices to the very serious injury of the producer, manufacturers and consumer.

"(3) That we deem it essential, unless the abuses above referred to be corrected, that the government restrict the use of the mails and telegraph service in connection with said exchange and the members thereof."

The presidents of the cotton manufacturers associations in South Carolina, Georgia, Alabama and Mississippi were elected honorary members of the North Carolina Association, it being thought that an interchange of knowledge and an alliance of interests would be beneficial to all.

Thomas R. Dawley, Jr's., articles on "Child Labor in Cotton Mills" were indorsed by the Association and several members expressed their approval and appreciation of his good work in successfully refuting the inaccuracies of previous writers who had maligned the cotton mills of the South and the great work they are doing in educating the young and raising the standard of living among the operatives.

Laurus Loomis, of Catlin & Co., New York City, had been invited to address the Association, and he spoke on cotton exports and the relation between Japan and Manchuria. Mr. Loomis spoke in part as follows:

"In Japan the United States has a rival not to be lightly esteemed. They are an imitative race, patient, working at low rates for labor; seven to twelve cents per day. They have cotton manufacturing machinery, automatic looms, and, moreover, are determined to hold the Manchurian market for cotton goods and her commodities.

"The railroad from the coast to the interior is under their control. The railroad agents and inspectors of customs are Japanese, and it can be well understood how any other nation will fare in competition with Japanese merchants under these conditions.

"The 'New York Herald's' Pekin, China, correspondent, J. K. Ohl, gave statistics showing over four million dollars worth of Japanese products virtually smuggled in, or at reduced rates in Manchuria last year, and the proposition of United States Secretary of State Knox as to authorizing a competing railroad in Manchuria under Chinese jurisdiction; but the capital furnished by other nations including the United States is meeting with positive hostility by Japan. They can scarcely conceal their irritation and opposition to this scheme. In a Japanese weekly they emphatically state that Manchuria was purchased by blood and treasure of Japan, referring to the war between Japan and Russia, and they will never surrender it willingly without force. Being heavily encumbered with debt owing to the late Russia-Japan war, Japan is naturally very cautious in its movement. Nevertheless, while professing the most sincere friendship to this country, which we gladly reciprocate, she is increasing her navy and strengthening her army. Every Japanese boy is taught that it is an honor to die for his country and the Emperor of Japan. And when the men are all slain in battle the women declare their determination to take the place of those who have fallen.

"The present congestion of cotton goods will be remedied ere long by improved trade conditions and curtailment of production. With ninety million of industrious and progressive people and over seven billions of dollars of products of the soil last year, not to mention the production of the mines, the United States will continue to grow and prosper and this highly favored Southland will have its full share of success."

T. L. Black, secretary and traffic manager of the Association, having just completed the compilation of cotton mills statistics for North Carolina, stated in his report that there is a total of $59,070,350 invested in textile manufacturing enterprises, in which are included 312 cotton mills and 70 knitting mills. Included in the cotton mills are 171 yarn mills with a spindelage of 1,344,098 spindles. The cloth mills comprise 141 mills with a spindelage of 1,885,022 with 55,049 looms. The total spindelage 3,229,119. There are 6,361 knitting machines in the 70 knitting mills. In comparing the scope of industry of North Carolina with the South, the figures show that the State has approximately one-fourth of the looms of the entire South and very nearly one-third of the spindles, the total spindelage of the South being 10,893,061 spindles and 229,214 looms.

ELECTION OF OFFICERS.

R. M. Miller, Jr., Charlotte, N. C., who has been president of the Association since its organization was re-elected for the ensuing year, and a vote of thanks was extended to him for his faithful and efficient services. Mr. Miller thanked the members for the honor, but stated that he had been prseident of the Association since its organization and did not want it again. He said that a new man would add life to the Association and put additional vigor into the work. He thought that rotation in office should be followed, and that no member should be allowed to succeed himself. Mr. Miller said that he felt like he had been a failure and he did not want to continue to be a failure. He read a resolution of thanks that was passed last year by the Association, in which the members pledged themselves to give their co-operation and support. J. F. Roberts, Lincolnton, N. C., suggested that a committee on co-operation be created, to consist of from one to three members from each county, whose duty it will be to secure membership of every manufacturer in the State and co-operate in the work of the Association. The number of members of the executive committee was reduced to twelve, and it is predicted that more satisfactory progress will be made during the ensuing year. The other officers of the Association were re-elected for the ensuing year as follows:

First Vice-President, C. E. Hutchison, Mt. Holly, North Carolina.

Second Vice-President, A. A. Thompson, Raleigh, North Carolina.

Third Vice-President, J. Harvey White, Graham, North Carolina.

Freight Manager, T. L. Black, Charlotte, North Carolina.

COTTON POOL INDICTMENTS.

Acting upon information received relative to an unlawful agreement in restraint of trade, the special United States Grand Jury on June 17th returned indictments against eight men alleged to have been members of a cotton pool formed in February last. These men are charged with conspiracy in restraint of trade under a new construction

of the Sherman anti-trust law, and the indictment is in five counts. The instrument is against a "definite combination for an avowed purpose which has been condemned by an act of Congress." Those indicted are:

James A. Patten, of Chicago, a wheat operator who has been active in the cotton market recently.

Eugene B. Scales, Houston, Texas, a cotton operator.

Frank B. Hayne and William P. Brown, both of the firm of W. P. Brown & Co., New Orleans, La., cotton dealers.

Col. Robert M. Thompson, New York City, a silent partner in the firm of S. H. P. Pell & Co., New York, cotton brokers.

Sydney J. Harman, Shreveport, La., a cotton operator.

Charles A. Kittle, New York City, who holds the cotton exchange seat of Pell & Co.

This prosecution does not involve any question as to the propriety of the methods of dealing in cotton on the New York Cotton Exchange, but deals with a specific case of a combination which was held by the grand jury to be contrary to the law embodied in an act of Congress.

The first count, after naming the defendants as above, cites a list of fifty-two cotton spinning and manufacturing concerns as "certain corporations not herein indicted," with which the defendants had unlawfully conspired to monopolize the trade in the cotton crop year September, 1909, to September, 1910. The cotton mills were enumerated by States as follows:

Alabama—Avondale Mills, Birmingham; Central Mills, Sylacauga; Enterprise Cotton Mills, Enterprise; Montgomery Cotton Mills, Montgomery; Prattville Cotton Mills, Prattville.

Georgia—Anchor Duck Mills, Rome; Canton Cotton Mills, Canton; Elm City Cotton Mills, LaGrange; Exposition Cotton Mills, Atlanta; Floyd Cotton Mills, Rome; Grantville Hosiery Mills, Grantville; Habersham Mills, Habersham; Lawrenceville Manufacturing Co., Lawrenceville; Lois Cotton Mills, Douglasville; Milstead Manufacturing Co., Milstead; Newnan Cotton Mills, Newnan; Roswell Manufacturing Co., Roswell; Sibley Manufacturing Co., Augusta; Scottdale Mills, Atlanta; Trion Manufacturing Co., Trion Factory; Unity Cotton Mills, LaGrange.

North Carolina—Cannon Manufacturing Co., Concord; Henrietta Mills, Caroleen; Mecklenburg Manufacturing Co., Charlotte.

South Carolina—Aiken Manufacturing Co., Bath; Belton Mills, Belton; Brandon Mills, Greenville; Capital City Mills, Columbia; Easley Cotton Mills, Easley; Glenn-Lowry Manufacturing Co., Whitmire; Granby Cotton Mills, Columbia; Greenwood Cotton Mills, Greenwood; Grendel Mills, Greenwood; Jackson Mills, Iva; Lancaster Cotton Mills, Lancaster; Langley Manufacturing Co., Langley; Monaghan Mills, Greenville; Ninety-Six Cotton Mills, Greenwood; Olympia Cotton Mills, Columbia; Ottaray Mills, Union; Pelzer Manufacturing Co., Pelzer; Piedmont Manufacturing Co., Piedmont; Richland Cotton Mills, Columbia; Riverside Manufacturing Co., Anderson; Saxon Mills, Spartanburg; Seminole Manufacturing Co., Clearwater; Toxaway Mills, Anderson; Union Buffalo Mills Co., Union; Victor Manufacturing Co., Greers; Williamston Mills, Williamston; Woodruff Cotton Mills, Woodruff; Woodside Cotton Mills, Greenville.

The formal statement relative to the matter which was given out by Attorney General Wickersham is as follows:

"These indictments are the result of an investigation commenced by the Department of Justice some time since based on information that the persons indicted with others had in the early part of the year formed a combination for the purpose of cornering the entire remaining supply of raw cotton of the crop of 1909 and to hold a substantial portion of the same under agreement not to make tenders in certain markets prior to about November 1, 1910, thus creating an artificial shortage, in addition to the crop shortage, in the supply available for the spinners, and making it possible to require them to purchase thereafter at an arbitrary price fixed by the pool.

At the same time agreements were said to have been entered into between the representatives of the pool and a number of spinners, whereby the latter agreed to join the conspiracy to the extent of purchases of several thousand bales of cotton to be removed from the market. Pursuant to this agreement the pool acquired about 350,000 bales of raw cotton for delivery in May, which, with a large amount already on hand, was to be lifted out of the three principal markets of the world. This complete control of the May market with the further purchase of several hundred thousand bales of the remaining supply for delivery in July and August was intended to complete the monopoly of the remainder of the crop.

As the facts were presented to the department, this appeared to be a typical instance of a combination for the purpose of forestalling the market, securing the entire visible supply of a raw commodity during a period of six months and securing the power to dictate the price to the consumer. And as bearing upon the larger question to which so much public attention has been directed of the high cost of living it was considered by the department as requiring thorough investigation. This investigation has resulted in satisfying the Grand Jury of the existence of the combination and of its criminal characteristics and the indictments have followed.

It is not to be understood that this prosecution involves any question as to the propriety of the methods of dealing in cotton on the New York Cotton Exchange, or of the question of dealings in exchanges at all. It deals with a specific case of a definite combination for an avowed and ascertained purpose, and that purpose one condemned by the act of Congress, namely, to restrain and monopolize interstate trade and commerce in a commodity, the free and unrestricted use of which is of prime importance to the whole nation."

COMMENTS ON THE INDICTMENT.

S. B. Tanner, ex-president of the American Cotton Manufacturers' Association and one of the most influential mill men in the South, had this to say of the recent indictment of the Government against alleged bull pool leaders and their alleged conspirators, numerous Southern mills:

"The New York Exchange forced the quotations in cotton down from 16½ to 13 cents. This caused the loss of confidence in cotton and cotton goods. It ruined the cotton mill business for the season. To show that these figures were fictitious the market went back to 15 cents in a few days. In order to steady the market for goods and protect themselves against such raids in the future, the mills decided to buy in New York and make them deliver the cotton. We bought cotton in New York for 13½ cents and

held it at 15. We had no idea of delivering the cotton at 13½. There is a law in regard to restraint of trade. We consulted one of the best lawyers before buying. We could buy in New York cheaper than we could at home. As I said, we had no idea of selling at the price we bought it at. We had agreed not to buy cotton above 14½ and to avoid speculation, and not to sell but to hold it. There was no speculation about it; we pursued the course we did to keep the market from being demoralized."

John A. Law, president of the Saxon Mills, Spartanburg, S. C., mentioned as one of the co-conspirators in the Government's suit against James A. Patten and others charged with conspiracy in restraint of trade in the cotton bull movement, said:

"We have no apologies to make to the New York grand jury nor to Attorney-General Wickersham nor to the Republican administration which he represents for such part as we have taken in the alleged conspiracy which, in spite of the Government's misdirected opposition, has interfered and is still interfering with the efforts to depress the price of cotton.

As citizens of the South we recognize to a profound extent that her financial recovery, the education of her citizens and the proper development of her natural resources are peculiarly dependent upon the obtaining of a fair price for cotton representing not only the South's but the nation's greatest export value. The honorable Department of Justice is, in our judgment, simply barking up the wrong tree."

GASOLINE MOTOR TRUCKS VS. HORSES.

BY A. N. BINGHAM.

Under certain conditions a very great saving may be effected by the use of gasoline motor trucks for the transportation of merchandise and supplies, and it is a matter of vital importance for every large handler of goods to ascertain what those conditions are and whether his own particular company can benefit from the installation of motor trucks. Briefly the answer can be found in the following single explanation:

A team of horses is capable of averaging from 15 to 18 miles a day with a load of three tons or about 50 ton miles. The actual time consumed in traveling the given distance is from five to six hours, leaving four or five hours to load and unload during which time the horses are resting.

A motor truck is not subject to these limitations for resting periods. A five-ton gasoline truck is able to travel 50 miles a day with a full load and do this day after day or 250 ton miles per day. The 50 miles can be covered in about six or seven hours, leaving three hours to load and unload. Therefore, the motor trucks operating at about double the expense of a two-horse team is capable of doing five times the work. If loads are carried in one direction only the proportion remains the same—25 ton miles for the team as against 125 ton miles for the five-ton truck.

The first thing for one to do therefore in putting motor trucks into service is to minimize the time spent in loading and discharging and retain as much of this 50 per cent. saving in cost as possible. If the loading and discharging time is extended to five hours, this only leaves five hours running time and cuts the distance possible down to 35 miles or 175 ton miles as against 50 for the team, a capacity in favor of the truck of three and one-half instead of five to one. It is, therefore, imperative on short hauls to minimize the standing time of the truck and to keep the wheels turning. A seven-ton truck will make as great a mileage in a day in actual city service as a five-ton truck.

The lighter truck should cover more ground, but so many conditions of road traffic interfere, such as corners to turn, crossing at which to slow down, impeded traffic, etc., that the actual mileage is about the same. For this reason the larger the truck carrying full loads the cheaper can goods be transported per ton mile. Take the figures above. If the seven-ton truck makes 35 miles daily, it carries 245 ton miles against the five-ton truck of 175 ton miles; in other words it is 40 per cent. more efficient at about 10 per cent. greater expense, and as against horses it has five times the efficiency at about two and one-half times the expense. Under favorable conditions the seven-ton truck will even make 50 miles daily or 350 ton miles.

For the transportation of coal, etc., from cars or depots to factories, the ten-ton truck is the proper size, for where full loads can be run in and shot out or dumped quickly, such as coal, gravel, sand, etc., the saving in carrying ten tons at a time is obvious. Recently, Burns Bros., of New York, probably the largest coal distributors in the country, ordered ten more ten-ton trucks from the company with which the writer is connected.

For companies which do not deliver their loads in two or three places but have frequent stops, the two or three-ton size of motor truck is more efficient. With a little careful thought in planning the transportation of merchandise in practically every line of business, it can be done much more economically and certainly with greater dispatch with the aid of power wagons than by the fast disappearing method of horse-drawn vehicles.

COTTON MANUFACTURERS' ASSOCIATION OF SOUTH CAROLINA.

The sixth annual meeting of the Cotton Manufacturers Association of South Carolina was held at Gate's Hotel, Hendersonville, N. C., on June 10-11, with about 75 members present, representing approximately 3,500,000 spindles. This Association is, in the words of President Ellison A. Smyth, "purely and simply a business organization, and through its committees on many subjects is a great benefit to cotton manufacturers." The business meetings are restricted to members only, and very little information is given out. Among the most important working committees of the Association are committees on bagging and ties; coal buying; cotton rules; legislation, taxation, traffic and waste.

The first session of the convention was called to order by President E. A. Smyth, of Greenville, S. C. As this was the business session, only members were present. After the president's report was read, the different committees on coal buying, bagging and ties, waste, and traffic, submitted their reports. Geo. W. Forrester, of Atlanta, Ga., traffic manager of the Association, also read his annual report. The subject of curtailment was discussed freely by the members, and a resolution was adopted unanimously endorsing the action taken recently by the American Cotton

Manufacturers Association at the Charlotte meeting, condemning the practice on the New York cotton exchange. Another resolution was adopted to the effect that the mills would close down for one week in July and one week in August, or two weeks in August, as a further means of preventing accumulation of stocks. The proposed change in cotton buying rules was referred back to the committee, which will later refer its report to the executive committee, and if approved will be published and mailed to the members.

SATURDAY'S SESSION.

The session on Saturday morning was devoted principally to the reading of papers by prominent men, the first being an address on "Power Transmission," by W. S. Lee, Vice-Pres., Southern Power Co., Charlotte, N. C. Mr. Lee pointed out the close relationship between his company and the textile interests of South Carolina, and outlined the plans of the company which contemplate connecting the different mill towns of South Carolina with an interurban trolley system. More than a hundred cotton mills now receive their supply of electrical energy from the lines of the Southern Power Co.

Hon. E. J. Watson, Commissioner of Labor and Agriculture, of South Carolina, was the next speaker, who presented an able address on textile conditions in South Carolina. Mr. Watson explained the inspection laws of the State and the various difficulties he had experienced in his endeavor to inaugurate a thorough, up-to-date and practical system, looking ever to results of a desirable character without setting back in any way or interfering with the progress of an essential industry. He stated, however, that the results obtained had more than justified the effort, and that his policy had been one of extreme conservatism, yet with a determination to bring about compliance with laws.

In discussing the subject of child labor, Mr. Watson advocated a revision of the laws of the State which would prohibit any child under 12 years of age from working in the mills. This was to be unconditional. He stated that to-day that are only 361 children under 12 years of age employed under exemption affidavits, and that he believed that the value of their services to the mills was not equal to the harm caused by this fact being distorted in the minds of the people in general. Mr. Watson gave deserved praise to the welfare work in the State, and commented also upon the uniformity with which the mill superintendents and overseers reported to the inspectors on the attendance of the children at school.

Ira W. Williams, of the Agricultural Department of South Carolina, made a short talk, setting forth information in regard to the experiments that had been carried on by this department looking toward raising longer fiber cotton in South Carolina. Mr. Williams stated that the experiments had been entirely successful, cotton of 1 3/16 inch staple having been raised and sold to mills using this class of cotton, and the results had been reported to be satisfactory. Mr. Williams also explained the work of this department in eliminating the boll weevil.

Thos. R. Dawley, Jr., formerly of the Department of Commerce and Labor, Washington, D. C., followed with an address on "Child Labor in the South," in which he showed that the condition of the children at the mills was far better than at their previous abodes in the mountain country.

All of the officers were re-elected for the ensuing year, as follows:

President, Capt. E. A. Smyth, Greenville, S. C.
Vice-President, V. M. Montgomery, Spartanburg, S. C.
Treasurer, J. A. Brock, Anderson, S. C.
Secretary, C. S. Manning, Greenville, S. C.

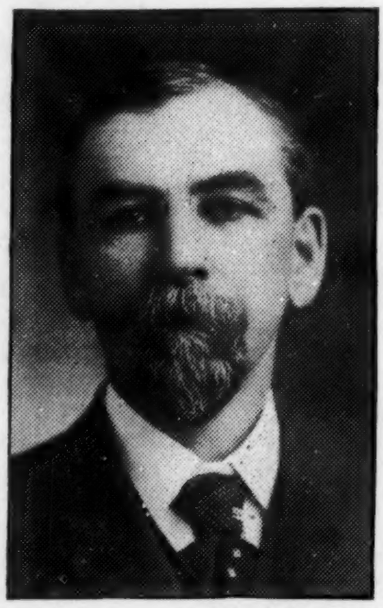
All of the members of the executive committee were re-elected to serve for the ensuing year as follows: W. J. Bailey, Clinton; J. C. Evins, Spartanburg; J. M. Geer, Easley; J. D. Hammett, Anderson; E. Nicholson, Union; and Z. F. Wright, Newberry, S. C.

The entertainment of the visitors was in the hands of the Retail Merchants Association who made every effort to provide a good time for the members while in the city. On Friday afternoon preceding the meeting, the members and their friends were entertained at Laurel Park by W. A. Smith, where a light lunch was served.

On Saturday afternoon the members were driven to Lake Osceola where refreshments were served at the Lakeview Hotel, from there the party proceeding to Lake Kamauga where a smoker was provided by George Stevens.

OBITUARY.

Lafayette Lanier, of West Point, Ga., one of the best known cotton manufacturers in the South, died from paralysis at his home on June 18th after a long illness. About three years ago Mr. Lanier was stricken with paralysis, but recovered to some extent, although he never regained his former health and strength. Recently he was taken to an infirmary in Atlanta, Ga., in the hope that something could be done to restore his health. When it became known that there was no hope for his recovery, Mr. Lanier wished to be at home when the end came, and he was taken to West



THE LATE LAFAYETTE LANIER, WEST POINT, GA.

Point on the private car of President Wickersham, of the Atlanta & West Point Railroad. In less than twelve hours, West Point had lost one of her most beloved and respected citizens.

Mr. Lanier was 65 years old at the time of his death and was president of the Lanett Cotton Mills, Riverdale Cotton Mills, West Point Mfg. Co., Shawmut Mills and the

Chattahoochee Valley Railroad Co., besides being a director of the First National Bank of West Point and connected in different capacities with a number of other industries. The positions that the West Point and Lanett hold to-day in the textile field are probably due more to the efforts and ability of Mr. Lanier than any other man. He spent a greater part of his life at West Point, and being always on the alert, he never let an opportunity pass to impress capitalists with the importance of his home town as a place for the investment of capital. The incorporation of the West Point Mfg. Co. in 1887 marked the beginning of the cotton mill industry at West Point under the leadership of Mr. Lanier. The Lanett Cotton Mills were organized in 1893 for producing sheetings, drills, duck and sateens, and is the largest of the mill properties in West Point. The Riverdale Mills were organized in 1898, and the Shawmut Mill, which is a unit of the West Point Mfg. Co., was only completed in 1909.

Mr. Lanier was a member of one of the most prominent families in the South, and is survived by six children. His two sons, George H. Lanier and Lafayette Lanier, Jr., hold important positions in the cotton mills of West Point, George H. Lanier being the vice-president of the mills mentioned, and Lafayette Lanier, Jr., being the agent. The four daughters are Mrs. R. S. Freeman, Misses Alice and Gilliland Lanier, of West Point, and Mrs. Bryant Dickson, of Athens, Ga.

GEORGIA INDUSTRIAL ASSOCIATION MEETING.

The Georgia Industrial Association held its tenth annual meeting at Brunswick, Ga., and Cumberland Island, on June 17th and 18th. The two sessions of the first day of the convention were held at the Oglethorpe Hotel in Brunswick. President J. J. Spalding, Atlanta, Ga., opened the meeting and delivered his annual address, in which he roundly condemned the present regulations of the New York Cotton Exchange. He spoke of the abuses of the present system of operating on that exchange and he believes that the cotton manufacturers have suffered material loss due to the unwarranted manipulation of prices. President Spalding also commented on the absence of adverse legislation in Georgia affecting the manufacturing interests, which had enabled this important branch of industry to make tremendous strides in development. Lewis W. Parker, Greenville, S. C., addressed the meeting on "The Necessity of Co-operation and the Advantages to Be Gained," in which he urged a closer relationship between cotton manufacturers as a means of conserving the interests of those engaged in cotton manufacturing in this State.

The afternoon session was devoted to the reading of reports by the Secretary and Treasurer and the standing committees, and the transaction of other business, including the adoption of a resolution voicing the disapproval of the Association of the rules of the New York Cotton Exchange. The resolution is as follows:

"Resolved, That this Association recognizes fully the benefits accruing from cotton exchanges operating under rules and practices fair to both buyer and seller, both producer and consumer, and which would tend to prevent manipulation of prices and to make quotations of prices on the exchange a fair representation of the real prices of spot cotton.

Second: That this Association does not feel that the rules and practices of the New York Cotton Exchange are of this character, but on the contrary believe them to be in the interest of the seller on the exchange, having therefore the effect of making manipulations of prices on the exchange, to the detriment of both producer and manufacturer and consumer.

Third: We recommend that the New York Cotton Exchange certificate cotton in bonded warehouses through the South, which would make unnecessary the present practice of tendering grades of cotton in New York that are undesirable and they should use market differences instead of arbitrary difference on grades above and below middling.

Fourth: That this Association expresses the sincere hope that the New York Cotton Exchange will rectify these conditions, but, if it does not, it feels that Congress in its power of control over mails and telegraph should take such action as to limit the disastrous effect on both producer and manufacturer of the extreme fluctuations and manipulations of prices now made possible by the operation of the present rules of the said exchange.

Resolved, That the proceedings of this convention be published in pamphlet form and that a copy be mailed by the Secretary to each member of the New York and New Orleans Cotton Exchanges.

Resolved, That the Executive Committee be given power to act in the matter of the employment of a general secretary to carry out the duties suggested by the President in his general address and to bring about co-operation among the mills.

Resolved, That the executive committee to be elected at this convention be given power to act in representing the Association in the matter of adopting for the members such sales note or agreement as may be determined upon by the committee of the National Association."

The morning session of June 18th was held at Cumberland Island, where the principal business transacted was the election of officers and the report of the committee on "Arrangements Proposed by the Special Committee for Disposing of Manufactured Goods in the Textile Lines," the committee consisting of Fuller E. Calloway, F. B. Gordon, L. C. Mandeville and J. L. Hand. The officers elected for the ensuing year are as follows:

President, Chas. D. Tuller, Atlanta, Ga.

Vice-President, Fuller E. Calloway, LaGrange, Ga.

Secretary and Treasurer, H. L. Johnson, Palmetto, Ga.

Executive Committee: J. J. Spalding, Atlanta, Chairman; H. P. Meikleham, Lindale; L. C. Mandeville, Carrollton; E. W. Swift, Columbus; Chas. D. Tuller, Atlanta, and Fuller E. Calloway, LaGrange.

CHANGE OF MILL CONTROL.

The dry goods jobbing house of Marshall Field & Co., of Chicago, Ill., has recently consummated transactions whereby this concern secured the controlling interest in a number of large cotton mills at Spray, N. C., formerly controlled by B. Frank Mebane, one of the best known mill men in North Carolina. The cotton mills involved in the transaction are: The American Warehouse Co., capitalized at $1,400,000, engaged in finishing and warehousing cotton piece goods; Lily Mills, capitalized at $68,000, making fancy colored cotton goods; Nantucket Mills, capitalized at $251,000, making fancy colored cottons and yarns; Rhode Island Co., capitalized at $125,000, making

cotton blankets and yarns; and Spray Woolen Mills Co., capitalized at $150,000, making blankets. To what extent Mr. Mebane's interests have been transferred to Marshall Field & Co., is not known, but it is believed that he is still financially interested in these properties. Owing to the lack of definite information, many reports have been in circulation in regard to the transfer of control. It has been known in certain circles that Marshall Field & Co. have been large stockholders in several of the Spray mills for some time, E. D. Pitcher, treasurer of the Rhode Island Co., having been generally regarded as the representative of that company. One report was to the effect that additional funds were needed to take care of and finance the mills at this time, and that Marshall Field & Co. had found it profitable to come into closer touch with these Southern mills.

It is not generally believed that Marshall Field & Co. had a mortgage on the plants, according to rumor, although it was known that within the past year advances had been made to the extent of about 80 per cent. on contracts by Marshall Field & Co.

The American Warehouse Co. may be termed a holding company for many of the mills involved in this transfer. It operates a finishing plant where the goods from these mills are prepared for the market, bills of lading being sent out from the offices of that company. The mill is equipped with napping machinery for producing napped goods, such as outing flannels and blankets. The company also has large warehousing facilities.

The present officers of the several mills and their equipment are as follows: Lily Mills, B. Frank Mebane, Pres., J. F. McAlister, Treas., 3,536 ring spindles and 386 looms; Nantucket Mills, B. Frank Mebane, Pres., C. P. Wall, Sec. & Treas., 11,616 ring spindles and 806 looms; Rhode Island Co., G. W. Fraker, Pres., 10,000 ring spindles and 144 wide looms; and Spray Woolen Mills Co., Geo. W. Fraker, Pres., B. Frank Mebane, Chairman, Lawrence McRae, Sec. & Treas., 5 sets of cards and 60 broad looms.

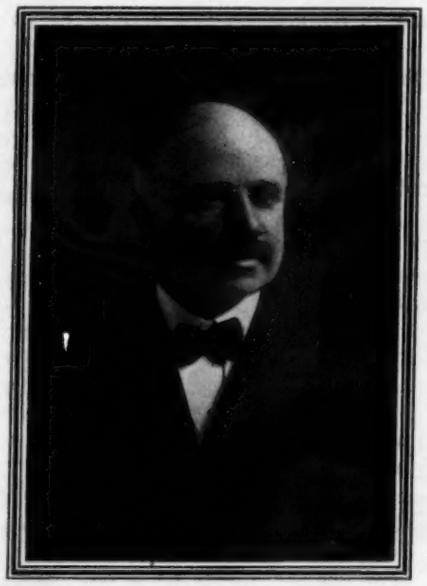
The taking over of such a large group of cotton mills by a large jobbing and retail establishment, such as Marshall Field & Co. has caused many members of the trade to surmise as to whether or not there will be a complete change in the marketing of goods throughout the West. If Marshall Field & Co. decide to supply their trade direct from their own mills, it is probable that they will be in a position to meet the lowest prices that can be named by other mills.

Some interests believe that the securing of this control by Marshall Field & Co. confirms the report that they will enter the commission house business. The policy which has been pursued for some time has been to control the product of certain mills which could be distributed to the jobbing and retail departments of the company. It is believed that no change will be made in the policy. The general opinion is that this transaction marks the inevitable trend by strong second hands to secure and maintain closer relationship with the producers.

The textile department of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh, N. C., has just completed a very successful year. This institution has the distinction of being the only textile school in the South to receive the students' medal from National Association of Cotton Manufacturers for the year 1910. The medal this year was won by Thomas B. Summerville. To illustrate the character of the work at the school, Professor Thomas Nelson, Director, has prepared for distribution a number of small samples of cloth showing various designs in color and weave. The samples range from colored ginghams and shirtings to fancy leno cloth, having mercerized filling. The first impression received by examining the fabrics is that the cloths have been made of such constructions as to be readily marketable, showing that the students have been trained in a practical manner. Both Professor Nelson and the students are to be congratulated upon the success of the textile department during the past year.

COMMENT ON CROP REPORTING SYSTEM.

George F. Hoffman of the firm of Hoffman-Corr Mfg. Co., Philadelphia, Pa., in referring to the method employed by the United States Government in reporting statistics relative to the condition of the cotton crop at stated periods, expressed himself very decidedly in favor of a change in the method of making these reports. "It simply means a continually unsettling factor for the manufacturer," said Mr. Hoffman. "What is the sense of the Government holding its returns from the public until stated periods, and keeping business paralyzed for several days before every report, and then creating abnormal confusion if not chaos when the report is finally made? This method



GEO. F. HOFFMAN.

virtually forces the manufacturer to resort to gambling, and I am at a loss to see how it can be excused or justified by any process of reasoning. Why does not the Government give us the returns as they are received by the Department of Agriculture and thus prevent these abnormal business conditions? In my mind this could and should be done with all expediency.

"In order to bring about a change in the method of crop reporting, every cotton manufacturer should write to his Congressman urging him to have this present method of making cotton reports changed, because this present system makes it so harassing for the manufacturer."

Mr. Hoffman is a natural enthusiast, and as a trustee of the Cushing Academy at Ashburnham, Mass., of which Arthur H. Lowe, ex-president of the American Cotton Manufacturers Association, is also a trustee, he has been an important factor in the upbuilding of this academy

The Textile Mill Situation in the South and New England.

NEW ENGLAND MILL SITUATION.

(*Special Correspondence.*)

The drastic curtailment schedules now operating in the textile industry appear to have little or no influence on the market for yarns and fabrics. A few lines of staples are moving freely, but the market as a unit is extremely lethargic, and bids fair to continue so through the summer months. Prices appear to have a firm undertone, and beyond the reductions made in prints and lines sold by Marshall Field & Co., of Chicago, who announced cuts of from 10 to 30 per cent. because of annual stock taking and inventory, there is no weakness in the price situation.

Every consumer fears that he will get caught with high priced goods on his shelves, and for this reason is buying very sparingly and virtually from hand to mouth. Converters are unwilling to take a chance because of the general impression among jobbers and retailers that the new cotton quotations will drop as fall approaches, and their belief that there will be a downward revision of prices of fabrics early in the autumn. As a result of all this, the country is buying fabrics from hand to mouth, and the third largest industry in the country is suffering intense depression with 50 per cent. of its machinery and operatives idle, and a summer of hardship ahead. If confidence could be restored the economic differences between supply and demand could be adjusted, then down would come the piratical flag of depression and idleness.

The writer has recently made a canvass of the commission houses in New York and Boston for the purpose of getting information at first hand regarding the fabric end of the industry. Selling agents are not as depressed as they were three months ago, and there is an undertone of extreme confidence that business will open up in the early fall months and continue strong into the coming year. New York commission houses have had a prosperous year so far as net profits are concerned, I am advised, and the average business done will compare very favorably with normal years. Economies have been vigorously practiced by the selling houses for eight months, which will result in favorable net profits on a possible gross business. Export houses have had to divert their attention to the domestic trade because of the extremely unfavorable markets for American made goods in the Orient and Red Sea countries. Houses handling coarse goods and heavy fabrics, such as ducks and drills, have been forced to develop selling connections with mills on fine and fancy goods so that their salesmen could offer a more diversified line.

J. Spencer Turner Co. have revised their duck price list, advancing prices quite substantially, and have increased the discount to consumers to 30 and 5 per cent. off the new list and slightly better than 35 per cent. off to the trade. This concern reports a better demand for light ducks and drills at firmer prices; but the heavier weights continue quiet. The mills whose products are sold through this corporation are running on curtailment schedules and propose to curtail during this month about the same as in June, and if business shows no improvement, heavier curtailment will occur in August.

The action of B. B. & R. Knight and Goddard Brothers, of Providence and New York, in cutting prices to stimulate trade is favorably accepted in the dry goods district. "Fruit of the Loom" sheetings were reduced ⅝ cent per yard, while Goddard Bros. made a price reduction of ½ cent on all standard goods. These cuts held good until July 1st, on which date an advance of ¼ cent was made and each firm guarantee that prices from July 1st to October 1st shall not be lower than the prices which went into effect July 1st. There was prompt response to the cut and many heavy orders placed for near-by deliveries.

Lord & Taylor, one of the best known retail and wholesale dry goods houses in the East, have been placed in the hands of a committee for reorganization. The situation is very similar to the Tefft-Weller reorganization which occurred several months ago. Both houses were of the old school type and required an infusion of contemporary business methods and men. It is probable that John Claflin will be instrumental in whatever plans are determined upon and that eventually the United Dry Goods Companies will absorb Lord & Taylor. J. P. Morgan & Co. are attending to the financial end of the reorganization.

The export market shows no evidence of improving although Chinamen have been requesting cable quotations on sheetings and coming back with firm bids just under the market. A few transactions have resulted in seconds but the business as a whole has been little more than a record. The Red Sea trade is only interested in drills for late fall delivery. The South American trade continues normal for the season. Colombia is buying prints, while Brazil has been buying quite generously of tickings. The Philippines and India are not interested in any line of fabrics at the moment, dealers report.

The yarn market has sagged off slightly on account of the dearth of orders. Braiders are buying at lower prices than last month, and in some instances there are indications of buying for fall requirements. Hosiery yarns are extremely dull with prices firm. Weaving yarns are being stocked faster than sold, so continued depression in this line is expected.

Manufacturers of textile machinery are curtailing operations for a summer of record breaking dullness. Crompton & Knowles Loom Works are completing back orders and getting ready for an extremely dull period for the next six or ten weeks. The Draper Co. is making large shipments of looms on contracts placed over one year ago; but reports little new business. The 1000 Northrop looms for the new Ponemah Mills of Norwich, Conn., are being installed and equipped, but probably will not be started until fall. These looms are without the magazine attachments and will be run on plain goods for a while. The Stafford Co. is making deliveries on the large order for the East Boston Cotton Mills and has recently accepted several large contracts in the South. Belting and strapping makers are running on reduced time and force, and are looking for a dull period until the fall opens up.

Textile mill shares are holding very firm with few offerings. The seasoned issues fluctuate slightly on small sales but are eagerly snapped up by mill share brokers. Fall River stocks are weak, while New Bedford issues hold strong with very few offerings. The share market as

a whole is very firm and bids fair to hold firm through the summer months.

SOUTHERN MILL SITUATION.

Perhaps the most important matters of interest to Southern manufacturers to come up during the past month have been the actions taken by several State cotton manufacturers' associations. The Georgia Industrial Association and Manufacturers' Association of both the Carolinas held meetings during June.

The South Carolina association met at Hendersonville, N. C., and adopted a resolution calling upon all mills to shut down one week in July and one week in August, besides closing July 2 and July 4. The expressed idea is to prevent "continued production of cloth, which cannot be sold at the present basis of the cost of cotton."

Resolutions were also unanimously adopted endorsing the action of the American Cotton Manufacturers Association at Charlotte recently in condemning present methods employed on the New York cotton exchange. Another important recommendation, which was endorsed by the Association, was that by President Smyth, in his annual report, "To amend the labor law of South Carolina to prohibit employment of children under 12 years of age for any cause whatsoever; to recommend to the Legislature a marriage certificate law, a birth registration law and a compulsory school law for children under 12 years of age."

The North Carolina manufacturers, at their meeting in Charlotte, N. C., did not take any official action on the curtailment question, although it may be said here that curtailment in North Carolina and other Southern States will be heavier during July and August than in any other months of the year.

The Association is to have a president and secretary, five vice-presidents and an executive committee of twelve. Each department is to be in charge of a vice-president and two members of the executive committee. They would have every department separate and distinct, and there will be no conflict of interests, while they will have the combined benefits of six associate organizations in one parent body. Under the plan, a mill in another State can join as an associate member and participate in the working of any division.

It is believed this new plan will remove many of the obstacles encountered heretofore, and will put the association on a much stronger basis for accomplishing results for the interests it represents.

The most important development in Southern textile circles during the recent past was the meeting of prominent mill men at Gastonia, N. C., on June 24, for the purpose of taking final action on the proposition to shut down their mills four weeks during the months of July and August. The movement was started by the Gaston County Spinners' Association, and on the day mentioned 58 mills signed an agreement to shut down entirely four weeks in July and August. This means that between 600,000 and 700,000 spindles will be idle during that period, and that during that time one million pounds of yarn and cloth will be taken off the market weekly for a month. The mills taking this drastic action are located in Gaston, Mecklenburg, Lincoln, Catawba and Cleveland Counties, N. C., and York County, S. C. This radical step was deemed necessary for self protection. It is believed that other mills in North Carolina will follow this example, and that curtailment, once generally put into effect, will save the situation.

T. W. Crews, secretary of the Southern Hard Yarn Spinners' Association, expresses the belief that during the months of July and August curtailment among Southern hard yarn mills will be sharper than during any similar period of the year. He thinks that most of the yarn mills will either shut down entirely, or curtail heavily during these months.

It is the general opinion that July and August will witness more general curtailment than has been carried on in the past two years, and it is believed this policy is bound to effect a much needed improvement in the markets. It is believed that the soft yarn spinners will also put into effect a concerted policy of curtailment, although no statement can be had from officials of the association.

One feature of the textile industry which is inspiring, and which demonstrates the abiding faith of capitalists in the cotton manufacturing industry, is the fact that the new mill construction record since January 1st is ahead of that of any other year. The Secretary of State of South Carolina reports that he has already collected a great deal more in charter fees than he did during a similar period last year; also that new industries chartered in South Carolina alone since the first of the year represent a combined capitalization of over $11,000,000, a large majority of which amount has been put in textile mills. One feature of his report is the fact that a new line of cotton manufacture has been undertaken in South Carolina, namely that of underwear making, two companies having been recently chartered with a capital of $50,000 each, to engage in this line of work at Greenville, S. C.

Last year over $23,000,000 was put into new cotton mills and improvements of old plants in the South. North Carolina's record is not behind that of South Carolina, for almost every week since the first of the year one or more big mills have been organized and chartered. Other Southern States have made a very gratifying showing. With the markets once restored to their normal basis, it is believed that the industry will enter upon an era of prosperity never before known in the South.

One of the largest transactions in mill control ever occurring in the South was that reported during June, whereby Marshall Field & Co., of Chicago, assumed control of several of the largest mills located at Spray, N. C. While no authoritative statement has been issued, it is understood the mills involved are the Spray Woolen Mills, the Rhode Island Mills, the Nantucket Mills, the Lily Mills, the Worth Mills, Nos. 1 and 2, at Worthville, N. C., the German American Co., and the Spray Water Power and Land Co., the parent corporation, the control of which has been sold by B. Frank Mebane, of Spray, and W. R. Walker. This transaction does not involve the Morehead and Leaksville Mills, owned by Walker and Mebane, and the Spray Cotton Mills, owned by George Mebane and the Holts. The transfer of the American Warehouse Co. does not affect Farish Stafford & Co., dry goods commission merchants in New York, as connections with this concern were severed some time ago.

It is generally believed that Marshall Field & Co. acquired control as a result of the mill interests hypothecating stock in return for money advanced on goods and for other purposes and failing to make settlements when the time expired. It was reported some time ago that the Chicago concern, which has always been a large stockholder in the various mills at Spray, had advanced a half million

dollars last fall in order that outstanding claims might be met and the organization maintained. It is generally understood here that Marshall Field & Co. have something like $2,000,000 invested in one way and another at Spray, and hence the necessity of stepping in and taking charge. It is a fact that a number of creditors were instructed to meet at Spray a short time ago, and all the claims that had been properly audited were settled in full by check given by the Chicago concern. It is regarded as a most fortunate outcome for the situation to have developed as it did. The assumption of control by the corporation assures the continuance of the properties.

Southern manufacturers, who have been interviewed since the announcement that indictments had been brought against alleged leaders of the bull pool and that many manufacturers were declared to be conspirators, expressed disapproval of the Government's action. They contend that cotton was bought in New York because bears were endeavoring to depress the market by selling below quotations in the South, and it was bought for actual use, hence instead of attempting to form a monopoly in restraint of trade they were merely endeavoring to remove artificial methods from the market in order that trade in raw cotton and goods might be free from that restraint. It is further pointed out that the action is a usurpation of State's right, and is unwarranted by law, since dealing on the New York exchange is not interstate commerce, according to a decision of the Supreme Court, and hence cannot be handled by the Federal Government, but only by the State of New York.

MARKET REVIEWS.

MONTHLY REVIEW OF THE COTTON MARKET.

BY H. & B. BEER, NEW ORLEANS.

Until of late there was no material change in the condition of the growing crop, favorable progress having been made as a rule, especially in the Southwest where the outlook remains most flattering, Oklahoma and Texas promising to make record crops this year. Recent rains, incessent in character in all sections east of the Mississippi River and in Arkansas, however, are complained of as being injurious, especially in Alabama and the South Atlantic States, and crop accounts from these sections are not satisfactory, fields becoming foul with weeds and grass, preventing proper cultivation of the plant.

As a result of the wet weather during June the Bureau crop condition of July 1st was less favorable than generally expected, the average for the whole belt figuring 80.7 against 82 for the previous month, showing a loss of 1.3 points, whereas a slight improvement was looked for, the trade having anticipated a condition of about 83. This latest report of 80.7 compares with 74.6 last year, 81.2 year before last, 72 in 1907, 83.3 in 1906 and a ten-year average for July of 79.5. As will be seen by the above comparatives, the year's promise makes a favorable showing when compared with the condition of crops at this date in former years and is actually 1.2 points higher than the ten-year average, while the acreage this year is 2.8 per cent. larger than one year ago and about the same as two years ago when a crop of 13,825,000 bales was marketed.

Were it not for the fact that considerable apprehension is entertained lest the weevils, which cover a larger area in Louisiana, Mississippi and Arkansas than last year, do much damage in the Mississippi Valley States, especially since wet weather has been the rule the past month, which is favorable to the propagation of the pest, it is probable that the trade would be more hopeful of a large crop this year. In Texas, however, the weevils are not so numerous as they were at this time in 1909, the excessive heat and long drouth last summer having almost annihilated them in that State, and we hear of very little complaint of damage on that account.

During the past month the deterioration by States was as follows: North Carolina 12 points, Virginia 9, Missouri 7, Arkansas 4, South Carolina and Georgia 3 points each, Florida, Alabama and Tennessee 2 points each, while Mississippi suffered a loss of 1 point. It is to be noted, however, that the Southwest is in splendid shape, Oklahoma leading the list with an improvement of 4 points, while Texas and Louisiana scored a gain of 1 point.

The Bureau report on conditions of crop June 25th, by States, is as follows:

June 25	State	1910	1909	1908	1907	Ten year average
90	Virginia	81	76	92	65	83
84	North Carolina	72	75	89	72	82
78	South Carolina	75	77	84	79	80
81	Georgia	78	79	83	78	80
84	Florida	82	88	84	83	85
83	Alabama	81	64	82	68	78
82	Mississippi	81	61	84	67	78
76	Louisiana	77	62	84	66	79
83	Texas	84	79	80	72	79
81	Arkansas	77	76	85	67	81
86	Tennessee	82	80	89	69	84
87	Missouri	80	83	87	64	83
84	Oklahoma	88	84	64	74	82
..	Indian Territory	..	..	..	73	..
90	California	95	..	..	..	..
82	Average	80.7	74.6	81.2	72	79.5

As to the probable future course of the market, it is probable that a very nervous feeling will exist. At the moment the idea prevails that chances are against a large crop, probably not more than 13,000,000 bales allowing 4,000,000 bales for Texas, and many contend that the South will do well to make 12,000,000 bales. The weather still remains unfavorable, still raining in nearly all sections of the central and eastern portion of the belt, while Oklahoma is commencing to need rain, and it is said that Texas is without sufficient moisture, and that unless good rains are had in the Southwest this month, prospects for bumper crops in Texas and Oklahoma will disappear. The world will need at least 13,000,000 bales for next season's requirements.

THE YARN MARKET.

With news at hand from all of the textile manufacturing sections of the country of drastic curtailment of cotton mills and especially among spinners, it is hardly necessary to relate that the condition of the yarn market showed no material improvement during the past month. While the asking prices of the spinners have held firm and their determination to maintain this position has been carried out at the expense of business, at the same time the greatest trouble has been the unusually small demand for yarns. Yarns spun from American cotton have sold at prices on 12½-cent cotton for some time, and since it is hardly probable that the price of the raw stock will fall below that figure for some time to come, the logical conclusion from a study of conditions would seem to be that yarn prices have reached their lowest point, and with a revival of the demand for yarns, the prices will immediately seek higher levels.

While spinners have insisted upon their own prices in accepting business, there has also been a certain amount of stock yarns disposed of at concessions, and this had of course a tendency to make more or less irregularity in the market. There is some uncertainty as to the amount of stock yarns on hand, some dealers asserting that the supply is very small, while other buyers maintain that the supply is relatively large. The fluctuations in the cotton market, however, had a more or less sentimental effect upon the yarn market, but the truth of the matter is that the lack of demand resulted in a hand-to-mouth business, and the buyers naturally were on the alert for any bargains in stock yarns that would answer their immediate requirements. It may be said that such small-lot orders represented the entire amount of business put through during the month. It was reported that several transactions specifying 10,000 or 15,000 pounds failed to be ultimately put through, owing to the unsettled condition in the cotton market.

Buyers seemed to feel the assurance of their position, which was emphasized by the variance between the prices they were willing to pay and those which the spinners demanded, the difference varying from ½ to 2½ cents. To illustrate the irregularity in the market, it may be mentioned that during the first part of the month 2-20s warps were sold at 22½ cents, while spinners were demanding 23 or 23½ cents. Just how long the hand-to-mouth policy will be pursued by the buyers is a matter of conjecture. Practically no orders for future delivery were being placed, and it would seem that buyers are probably overstaying the market.

In reviewing the demand for yarns from specific sources —or it may be termed a lack of demand—the carpet trade showed probably more interest than any of the others and purchases of 8s three-ply were reported several times during the month. The requirements of yarns for insulating wire were filled in small lots at different times, which served to make this trade a little more active than it had been for the past month or two. The webbing trade was conspicuous by its absence. This would also apply to the silk trade. Some improvement was reported in the underwear manufacture in the northern part of Pennsylvania, and while several inquiries were received from this source, no great volume of business eventuated. The hosiery mills were rather dull and some of them were only working on samples. Hosiery yarns may be said to have been more or less irregular with firmer quotations on coarse counts than on the finer counts. Weaving yarns showed a firmer tone during the latter part of the month, so far as the quotations were concerned, which represented the ideas of the spinners. Stock yarns of course played an important part in this department, and reports of sales of these yarns were heard of at different times.

The end of the month witnessed an increased number of inquiries and a larger number of transactions than for some time, owing to the fact that spinners made some concessions and at the same time the buyers were willing to meet the new prices. In other words there was more of a willingness of both sides to concede a certain amount which had the effect of bringing them closer together. This was especially true of weaving yarns, which were shaded slightly, and buyers took advantage of this concession. The hosiery yarns were maintained at previous prices, and the tone was firm due in a large measure to the fact that the majority of mills on these yarns have curtailed heavily and are not attracted by offers below the figures which would mean a loss to them. Such a position is practically impregnable and it is hoped will aid materially in bringing the market back to a satisfactory state.

SOUTHERN SINGLE SKEINS

4s to 8s	20	@	22s	22½	@23
10s to 12s	20	@21¼	26s	23	@23½
14s to 16s	21	@21½	30s	23½	@24
20s	22	@22½			

SOUTHERN TWO-PLY SKEINS

4s to 8s	20	@21	36s	28½	@29
10s to 12s	21	@21¼	40s	29	@30
14s	21	@21½	50s	34	@35
16s	21½	@22	60s	40	@41
20s	21½	@22	3-ply 8s up-		
24s	22½	@23	holstery	22	@...
26s	23	@23½	4-ply 8s up-		
30s	24	@24½	holstery	22	@...

SOUTHERN SINGLE CHAIN WARPS

8s to 10s	20	@20½	22s	22	@22¾
12s	20½	@21	24s	22½	@23
14s	21	@21½	26s	23	@23½
16s	21½	@22	30s	24	@24½
20s	21½	@22	40s	30	@31

SOUTHERN TWO-PLY CHAIN WARPS, ETC.

8s to 10s	20	@21	26s	24	@24½
12s to 14s	21½	@22	30s	24	@24½
16s	22	@22½	40s	30	@31
20s	22½	@23	50s	35	@36
24s	23½	@24			

SOUTHERN PEELER FRAME CONES

10s	20¼	@...	20s	22	@22½
11s	20¾	@...	22s	22	@22½
12s	21	@21¼	24s	23	@23½
14s	21¼	@21½	26s	23½	@24
16s	21½	@22	28s	24	@24½
18s	21½	@22½	30s	24½	@25

THE KNIT GOODS MARKET.

Of chief interest in the knit goods market during the month was the opening of lines for the spring season of 1911, which, on account of the poor market conditions, had been delayed for some time. During the first part of the month the most important items of conversation in the market were conjectures as to when the long-looked for opening of spring lines could occur. The advent of this important development was delayed until the last week in the month, but the activity and interest displayed in the new lines gave the market an aspect of activity which was welcomed by every one.

The beginning of the month found trading in a state of extreme dullness, and a feeling of uncertainty pervaded the market, no one seeming to have any definite idea as to the probable trend of affairs in the future. The business

of the present season had been practically cleaned up, and that of the Fall season had been about 50 per cent. contracted for. Information relative to the opening of the Spring season was very indefinite, if not entirely lacking, and a great many mills had not made any noticeable preparations toward that end. It is true that some fancy lines and the better grades of fashioned goods had been opened up for the new season, but as this division has very little in common with the medium grades, it had no bearing upon the probable time that the regular opening would take place.

One of the main deterring factors in the situation was the uncertainty as to the prices of the lines for the new season. It appeared that the different dealers were holding off, waiting for the others to take the initiative in making the prices. There was considerable conjecture as to whether prices would be the same as at the opening of the season for 1910 or would show an advance over those figures. As far as could be learned the advances have been general for the new Spring lines, and vary from two and one-half to five cents above last year's figures.

Continued dullness characterized the market during the middle of the month owing to the general uncertainty as to the spring opening, and the fall business was also practically at a standstill. There seemed to be more speculation as to what was to be done than any effort to take steps to get the opening of the new season under way. It is true that a few dealers placed some orders on staple lines for the next Spring, but they were what are termed steady sellers and on which buyers have a fairly well defined demand. Some few orders were placed before the prices had been decided upon, and that question was to be settled later or at the prevailing prices at which other dealers opened.

When the opening did begin it started in with a rush, led by two of the large staple lines of hosiery, and some very nice orders were booked shortly after the lines were displayed. It is believed that the advanced prices will be maintained, if not raised, as the buyers were offered good bargains at the opening prices, considering the cost of cotton and yarn. Standard 1 lb.-8 goods opened at 70 cents compared with 65 cents and 67½ cents for the same stock last year. The arrival of the warm weather in New York was held responsible for the activity connected with the opening of the new season's goods, and light weight hosiery was in active demand. The delay of a month or six weeks which has been lost in getting under way can not be made up, but from the indications in the market at the end of the month, more activity will be apparent than for some time. This will undoubtedly have a beneficial effect upon the other markets and will be gladly welcomed in all departments.

COTTON MANUFACTURING

ABORIGINAL AMERICAN WEAVING.*

BY MISS MARY LOIS KISSELL, AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK CITY.

Wonderful as is the development of modern machinery for the manufacture of American textiles—machinery which seems almost human in the way it converts raw materials into finished cloth; just as surprising are the most primitive looms of the American aborigines, who without the aid of machinery make interesting weavings with only a bar upon which to suspend the warp threads, while the human hand completes all the processes of manufacture. Modern man's inventive genius in the textile art has been expended upon perfecting the machinery, while primitive man's ingenuity has resulted in making a beautiful weaving with very simple means.

No doubt could we know the history of primitive loomwork in America prior to the coming of the white man, we would find an extended distribution of weaving, but all early textiles have been lost owing to the destructibility of the material and the lack of climatic and other conditions suitable for their preservation—conditions such as are present in the hot desert lands of the Southwest and the coast region of Peru. However, so many impressions of weaving have been found on early pottery as to assure us that beautiful work of this kind was made in the eastern, middle and southern United States.

In western British Columbia at the present time there are tribes carrying on certain forms of weaving which show four interesting types. The simplest type is the cedar bark mat woven of flat strips in horizontal and vertical lines as shown in Fig. 1. In the beginning, wide strips of the inner bark are hung from their middle over a crossbar of wood which is supported at either end by an upright beam. The halves of the strips hanging in front are then split into strands of the desired width, and a line of fine twining woven across to hold them securely. The checker weaving of the mat is now begun at the left edge by doubling the weft element over the last warp and weaving with the doubled element over and under one warp

MISS MARY LOIS KISSELL.

*Read before National Association of Cotton Manufacturers.

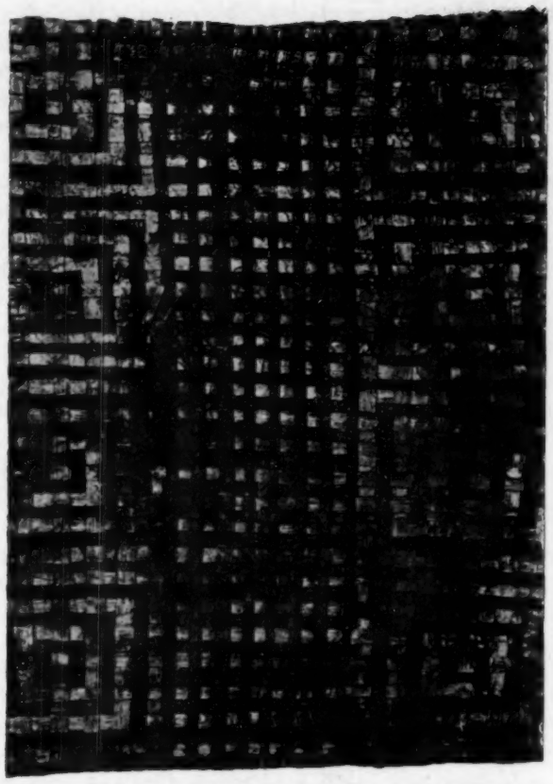


FIG. 1. CEDAR BARK MAT WOVEN BY BRITISH COLUMBIA INDIANS.

until the right edge is reached where it is turned back and slipped under an inch of the weaving just completed. The bottom edge is finished by turning up the warp ends below the last line of weft and binding them with a row of twining just above this last weft.

In their industries, primitive people always utilize the materials found in their environment, because no means is afforded them as in modern life, for the transportation of materials from a distance. British Columbia is rich in cedar trees, so it is not strange that material from this tree enters so largely into their weaving. It lends itself very delightfully to the technic of these mats, while its golden brown checked surface is at times crossed by black lines or broken by a group of black checks in simple designs.

FIG. 3. UNFINISHED CHILKAT INDIAN BLANKET.

The second type of weaving, also of cedar bark, is begun like the last mat, but the elements are so placed as to cross the surface diagonally—alternate strips passing diagonally downward to the right and left as in Figure 2. The strips are not woven, but are plaited over and under each other without the addition of a weft elements as in weaving. When the side edge is reached they turn at right angles and continue to plait in the changed oblique direction. The lower edges are finished by bending the elements at right angles and plaiting them obliquely back for an inch into the completed surface. Checked weaving is employed in a variety of ways, for aside from matting it enters into the construction of baskets, pouches, bags, sails, raincoats, babies' hoods, and a number of other articles.

Softened and shredded cedar bark plays an important part in the clothing of this region, especially in blankets. In weaving, the warps are not thrown over the crossbeam as in the other loom but are supported on a cord which itself is bound to the beam by another cord. Neither are the warps united by a strip of weft running over and under, but by a two-strand weft element which twines about the warps. To my knowledge this form of weaving has never been reproduced by machinery as no machine can make threads twine. The blankets of cedar bark are un-

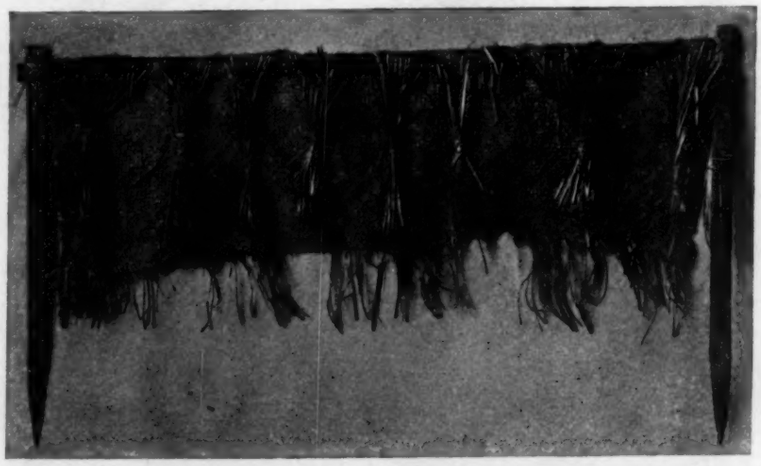


FIG. 2. LOOM OF BRITISH COLUMBIA INDIANS WITH PLAITED MAT.

decorated, but those of wool frequently have strands of another color passed across the surface and caught into the weaving from time to time. The lines of weft are not driven home, but are set some distance apart varying on different garments. At the edge, however, there is frequently found a band of closely woven twining, at other times a band of fur or a long fringe may complete the edge.

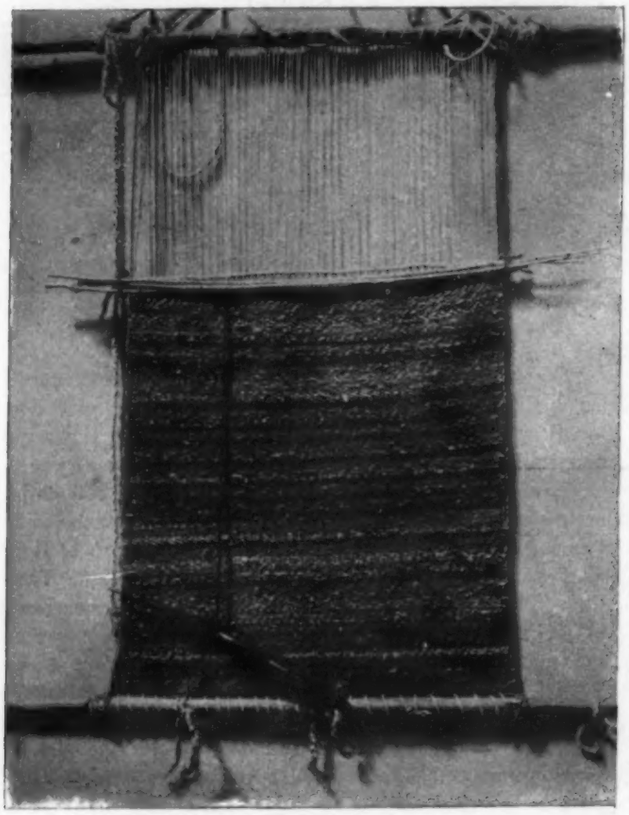


FIG. 3. BLANKET LOOM OF THE NAVAJO INDIANS.

The most beautiful weaving of this region is the Chilkat blanket, shown in Figure 3, a weaving which is unique in technic and design, both in primitive and modern textile art. It is a ceremonial garment, and the gorgeous designs in white, blue, yellow and black are of totemic significance and relate to the ceremonial life of the Indian. These designs are first painted upon a pattern board the size and shape of those to appear upon the blanket, and it is from this that the squaw weaves her pattern. But although the woman does weave the blanket, the man also has his part in the process, as he furnishes the loom, the pattern board and the skin of the goat. The squaw prepares all the materials and collects the bark, for the warp is of shredded two-ply cedar bark wrapped with a thread of wool, while the weft is entirely of the soft hair of the mountain goat. During the spinning the woman sits on the ground with legs outstretched, the crude wool by her left side within easy reach. She draws it out with her left hand and feeds it to her right hand, in the amount necessary to form the required size of thread. As it is received between the palm of the right hand and the right thigh, it is rolled from the body and falls to the side in loose, connected thread. This soft thread is next spun between the palm of the hand and thigh to form a single tightly twisted strand; and by the same process two of these strands are rolled together to form the weft thread of the blanket.

It is interesting that the small blocks of design are woven separately something as a tapestry, and later the blocks are sewed together with a thread of sinew from the caribou or whale.

The weaving from this region which most nearly approaches machine work in process of making is the dog-hair and goat's wool blanket. It is woven upon a loom of two revolving cylindrical beams, supported by upright posts at either end (Figure 4). The end of the warp thread is attached to a staying cord stretched from post to post about midway between the revolving beams. The warp then encircles the loom, catches under the staying cord, then turns and travels back to its starting point, there

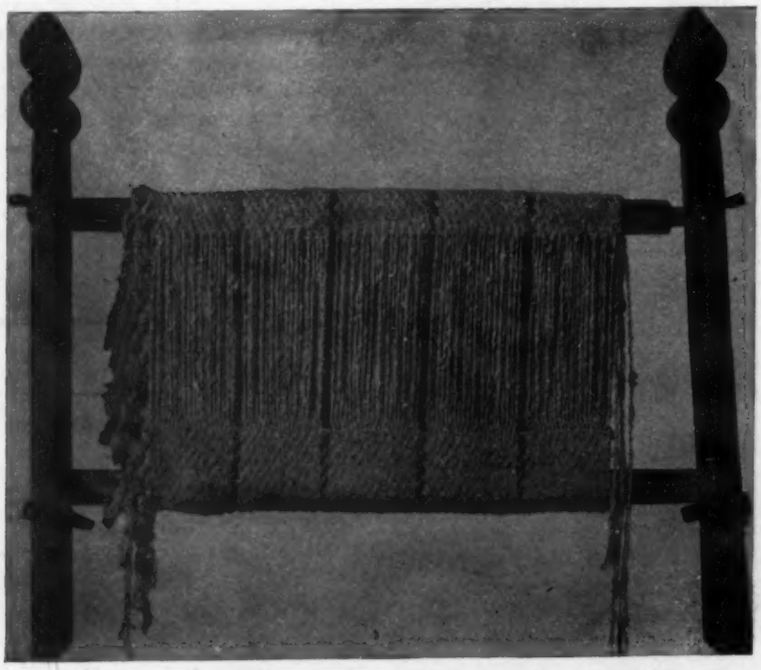


FIG. 4. ANOTHER TYPE OF LOOM OF THE BRITISH COLUMBIA INDIANS

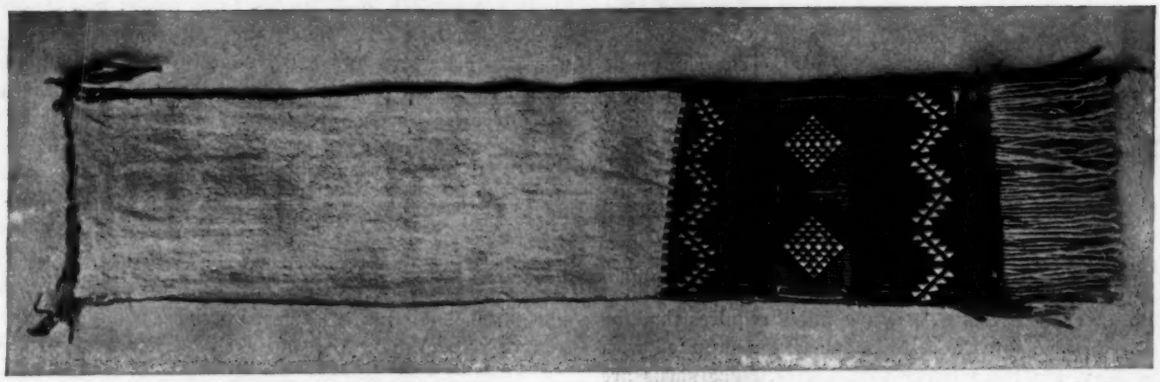


FIG. 6. SPECIMEN OF WEAVING BY THE HOPI INDIANS.

to catch under the staying cord and repeat the operation. The weft moves across the warps as in twilled cloth. Dog's hair, duck down and goat's hair are the materials used, especially the latter. These materials are spun in two-ply thread twisted partly upon the thigh of the weaver and finished on a spindle.

Leaving this weaving area in western British Columbia, we pass to the other locality of note in North America where primitive weaving is practised,—in southwestern United States and northern Mexico. Here the loom work is at a more advanced stage of development than that of the northern area, the weavers making use of a loom frame, sheds, healds, batten and an improvised shuttle. The Navajo Indians are the most skilled weavers north of Mexico and a description of their weaving is fairly typical of this area. As the warps are of soft pliable threads they must of necessity be stretched between two beams. These are suspended vertically if the weaving is to be any great size, the distance between them being that of the proposed length of the blanket (Figure 5). The warp threads are not stretched across the beams with an oval movement but are laced over them, forming two sheds, the upper of which is held intact by means of the shed-rod, and the lower by a set of healds

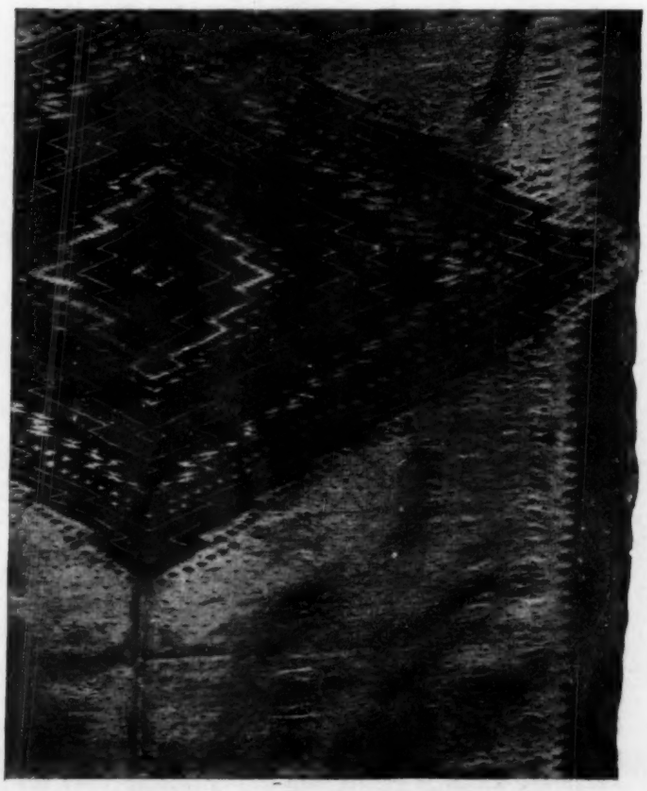


FIG. 7. MEXICAN SERAPE, OR BLANKET.

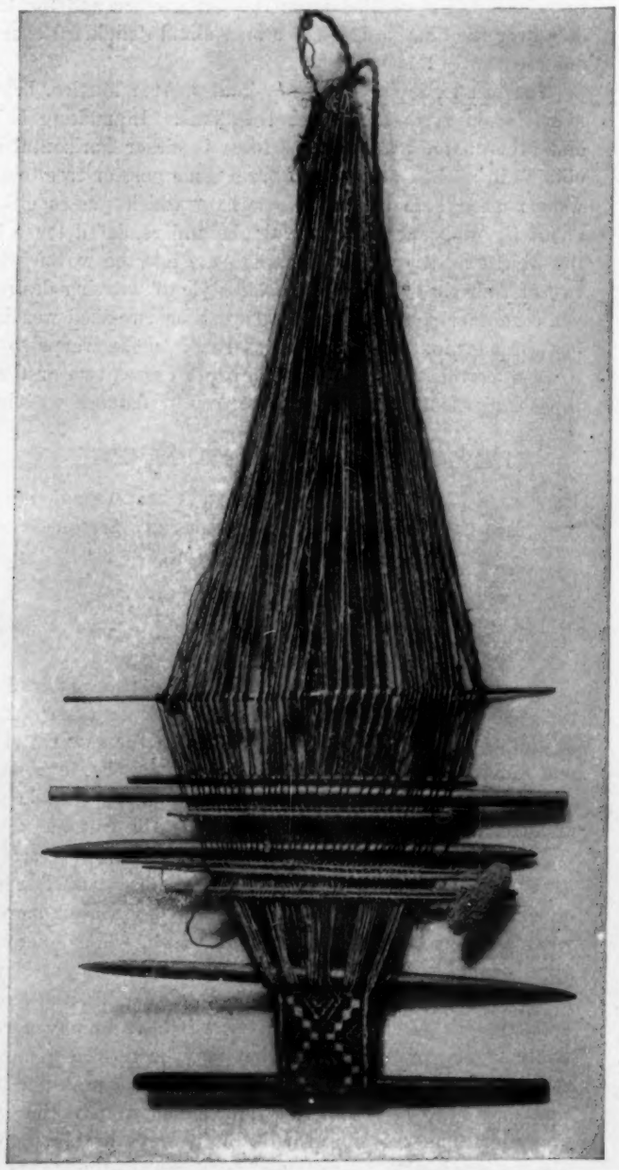


FIG. 8. MEXICAN BELT LOOM.

passing over a heald-rod. A wooden fork serves as a reed and a slender twig as a shuttle. Upon this twig is loosely wound from end to end the weft thread. The shuttle at one move crosses less than half of the warps as the batten—a flat stick of hard oak—is too short to open more than that length of the shed for the passage of the shuttle.

A number of Hopi Indian patterns have a fine white line of tracery upon the dark background and it is this play of the fine line pattern on the fabric which is one of the chief beauties of Hopi weavings. The sparkle of white is very brilliant in Figure 6. They make constant use of the diagonal or twilled technic, a weave which requires that the warps be divided into four sheds, the upper supplied with a shed stick, the three lower with healds. The sheds are shifted in a variety of orders for the construction of different patterns.

One of the most beautiful weavings the writer has ever seen from the southwest is that pictured in Figure 7, which is, however, only a small center portion of the beautiful serape from Mexico. The pattern, in two colors of indigo upon a tan-colored ground, is especially effective, while the tiny blue dots sprinkled upon the tan surface and the tan dots over the blue design add a subtle and delightful charm not frequently met with.

The last example, Figure 8, is also from Mexico, being a belt loom from the Huichol Indians. In making belts and other narrow fabrics the loom is either horizontal or oblique in position, stretching from some post or tree to the weaver and there attached to a loop which passes either about the waist or under the thighs and rendered tense by the weight of the weaver. These belts may be woven with two or four sheds according to the style of weaving desired, while another method of pattern work on two-shed weaving has the addition of a round stick run into the warps so as to raise certain threads while the weft passes two or three times underneath, producing a variety of damask weaving.

THE LEADING GROWTHS OF COTTON.

PRINCIPAL VARIETIES OF THE WORLD—CHARACTERISTICS OF THE COTTON FIBER—FULL GRADES OF COTTON—MOISTURE IN COTTON.

(*Contributed exclusively to* COTTON.)

BY WM. H. DOOLEY.

In order to intelligently purchase the raw material of the cotton manufacturer, to arrange the "mixings," or in any other capacity have much to do with the raw material, one should know as much as possible of its characteristics; for ignorance of these facts may cause much trouble and no little loss to those who have to spin the cotton.

Each crop differs from the previous one to a greater or lesser degree. It depends entirely upon the weather, which of course, is variable. Thus in a very dry season there is what is termed a "droughty crop," which, while it may be (and generally is) clean and well up in class, yet it will be poor in staple; and in order to obtain the desired length and strength of staple, the buyer will have to pay a relatively higher price than in what may be termed a normal season. Again, in a crop that is poor in class—a defect that may have been caused by too much rain in the early or middle stages of its growth, or by unfavorable weather for the production of cotton of good grade—the staple will probably be all that could be desired, but the buyer will have to pay more to obtain his usual grade, and especially so if he requires it for good filling. Then there are seasons when the crop turns out fairly good in class and staple, but the cotton is dirty, or abnormally leafy; and in this case the buyer has to exercise great care and judgment in calculating the extra loss that will ensue.

THE AMERICAN CROP.

The first step taken is the preparation of the ground for planting. This begins in the southern part of Texas as early as the middle of January; in Florida about the third week; in Alabama, Georgia, Mississippi and Louisiana, about the beginning of February; in Arkansas, Tennessee and South Carolina from about the middle of February to the beginning of March. Actual planting begins (according to latitude) principally from the middle of March to the middle of April, and ends in the first-half of May. These dates, however, are dependent upon the state of the weather. When the weather is usually wet the start is late, the plant suffers from the rank growth of grass and weeds, and extra labor is required to keep the fields clean. In abnormally hot weather, especially after rains, the plant sheds its leaves, thus exposing the bolls, which fall off, whereupon replanting becomes necessary. In addition to injuries by the weather the cotton plant is subject to depredations by insects. Of late years the greatest pest has been the Mexican boll weevil.

When the crop is an early one, picking may commence, in the districts in which it ripens first, in the latter half of July; but the usual date is the beginning of August, following on in the various districts in succession until the early part of September. The plant goes on fruiting as long as the weather is mild and open. It finishes in the early regions about the beginning of December, the others following through December and closing in the later regions about the middle of January. Frosts play an important part in the ultimate yield. An early killing frost over the entire belt would curtail the size of the crop by 500,000 bales in a season such as the last, when about 32,000,000 acres were planted, and there have been normal conditions. Light frosts and late frosts do little harm to the cotton plant; in fact, it is contended that the late frosts do much good under certain conditions of the crop, by opening bolls that otherwise would not open, and thus adding to the quantity of the late pickings. The effect of frost upon the lint so picked is to produce tinged and stained cotton. Early killing frosts occur in some seasons in the early part of November, when much of the yield may be curtailed. When a killing frost occurs late in the season, when the fruiting is practically completed, it has little or no effect upon the yield except as regards the color.

Cotton grown over the wide area of the Southern States under widely varying conditions of soil, climate and care in cultivation naturally varies in length, strength and other qualities of staple. Cotton known as "Uplands" or "Boweds" varies in length from three-fourths to one and one-sixteenth inch and is used for filling; this is grown in North and South Carolina, Georgia, Florida, Alabama and Tennessee. Cotton used for twist is grown in Texas, Louisiana, Mississippi and Arkansas, and the length of the staple varies from one to one and three-sixteenths inch. In the swampy and bottom lands in some of the above named States (notably Alabama, Louisiana, Mississippi and Arkansas) cotton is grown with staple ranging from one and one-eighth inch to one and one-fourth inch. In ad-

dition to these, there are specially long stapled growths, known as "Extras," "Allen Seed" and "Peelers" which measure one and three-eighths to one and five-eighth inches. Of late there has been an extensive demand for long stapled American (one and three-sixteenths to one one and one-half inch) owing to the development of fine spinning.

BRAZILIAN AND SMOOTH PERUVIAN.

Cotton of these growths is in a measure a substitute for American, especially for twist, but the quantity grown and exported to this country is insignificant, as compared with the American crop.

ROUGH PERUVIAN.

The nature of this cotton resembles wool so nearly, that it is almost exclusively used to mix therewith. The staple is rough and generally strong, and is of a springy tendency, that is, it does not lie close like American cotton.

EAST INDIAN.

Unlike the foregoing countries, India depends upon the monsoon for its moisture, and the success or failure of the crop is decided by that phenomenon of nature. The land is prepared before, and the planting begins after the breaking of the monsoon. Picking generally begins in Bengal, Dhollerah and Comptah. The season extends to about the middle of March. Madras is the latest, it being about April. There is not the same care bestowed upon the cultivation of the Indian cotton, nor are such improved methods practiced, as rule in America. The ancient routine of past generations still persists and as a consequence the yield per acre is less than one-half of that in America. Moreover, the acreage planted is only about two-thirds that in America. The better growths of East Indian cotton were once largely used in this country for filling, owing to their good color and cleanliness; but of late years the consumption has steadily decreased, owing chiefly to the increased takings by the Indian mills; secondarily to the exports to China and Japan, and also to the preference shown by English spinners for American cotton.

EGYPTIAN COTTON.

Egyptian cotton does not depend upon the rainfall for the success of the crop, as do other growths, but upon the overflow of the Nile. Prior to the completion of the irrigation works in 1902 at Assouan and Assuit, the risk of failure was always great; since then, however, a sufficient supply of water has always been available. The rising of the Nile begins about in July and culminates about in October. The fertilizing properties of the muddy deposits of the waters are very great, and this accounts for the exceedingly good staple that characterizes this growth of cotton. It has been thought by some that since the building of the dams a percentage of the deposits have been prevented from reaching the land and thus fertilizing it fully; but any disadvantages on that score are immeasurably compensated for by the certainty of an abundant supply of water. The best qualities of Egyptian cotton are grown in lower Egypt.

Egyptian is largely used in the manufacture of hosiery, and also for mixing with worsted yarn. Owing to its gloss it is used for mixing with silk, and on account of its strength it is made into the finer sewing threads. In addition to cotton, other crops are grown in Egypt—rice, sugar, beans, barley, onions, etc., and the acreage devoted to cotton is regulated to some extent by the prospects as to which crops are likely to pay best. It is calculated that not more than one-third of the area is usually devoted to cotton.

SEA ISLAND COTTON.

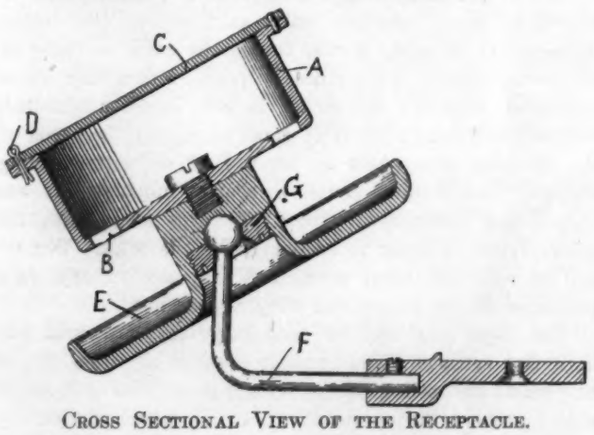
This is the finest growth of cotton and it commands the highest price. The staple, which is very long and silky of a slightly creamy color. It varies in length from 1½ to 2½ inches. In this cotton the natural twists are more numerous and even than in any other variety. Counts as high as 400s are often spun from Sea Island cotton, while for purely experimental purpose 1000s yarn has been spun. It is used for making very fine muslins and other fabrics, and is also largely mixed with silk. It is said that this cotton was first introduced into America in 1786 from the Bahama Islands where it had been brought from the West Indies. It was first cultivated in Georgia when it was found that the small islands running along the coast were best adapted for its growth; hence the name "Sea Island." It was also grown on the uplands of Georgia, but although remaining good, the quality deteriorated.

(*To be continued.*)

IMPROVED RECEPTACLE FOR SPINNING TRAVELERS.

The object of this simple device is to provide effective means for holding in bulk travelers for spinning rings, and for delivering the same in small quantities in convenient position for use when required.

The travelers used on the rings of spinning frames are apt to bunch together in clusters or chains, and when the operator requires a few travelers he dips his thumb and finger into the mass of travelers, picks up a bunch and shakes it, with the result that the few required are separated while at the same time probably a much larger number are thrown onto the floor. Such travelers as drop to the floor are practically wasted, as the operator has neither time nor inclination to pick them up, and in the course of a year the waste amounts to no inconsiderable sum.



CROSS SECTIONAL VIEW OF THE RECEPTACLE.

By means of this new arrangement the travelers in bulk are placed in a closed receptacle provided with an outlet orifice, and when travelers are needed the operator tilts the receptacle, thereby shaking out a few travelers which pass from the orifice into an open, shallow pan-like receiver below the receptacle. When the travelers are in the receiver they can be removed easily and quickly, without waste, whenever they are required.

The details of the device are shown by means of the accompanying illustration which is a cross sectional view of the appliance. A traveler receptacle A is provided con-

taining slots B at the bottom through which the travelers may pass individually when the receptacle is shaken. A cover C is used to keep the travelers from being taken out from the top and to protect them from dirt. A cotter pin D is used to secure it in place. Located below the receptacle A and attached to it is a receiver E to catch the travelers as they drop from the receptacle. The receptacle and receiver are carried on an L-shaped extension F, the top end of which is shaped like a ball. By screwing the piece G into the receiver E, a ball and socket joint is made, thus allowing the receptacle to be tilted very easily to shake the travelers out as needed. The illustration shows the normal position of the receptacle. When the receptacle is full, it requires more shaking to drop the travelers out than when it is nearly empty. This is due to the mass of travelers obstructing the slots through which they have to pass.

HINTS ON COTTON CARDING.

(*Contributed exclusively to* COTTON.)

BY ROBT. HANNAN.

Practically speaking, carding is the last cleaning process to which cotton is subjected and it is therefore, very essential that the very greatest precaution should be taken in the operation of the card. It is a fact that if this process in the manipulation of the stock is given proper attention, it is possible to avoid a great deal of unnecessary waste in the succeeding processes.

The chief aim of every carder should be to obtain a sliver as free as possible from nep and dirt, and of the utmost regularity. When neps are noticed in the web which is an admirable place for detecting impurities, it should be the overseer's duty to check this evil as soon as possible, for if this trouble is not remedied, the neps will certainly make their presence apparent in the finished yarn to its consequent detriment.

One of the many causes that tends to produce neps, is known to many practical men as "rushing the cotton through," or in other words, having the cards working at too great a speed. Take a case in point; a firm with whose innermost workings the writer is very much acquainted, had an insufficient number of cards to supply the needs of the spinning department on account of the latter having changed from medium counts to coarser numbers. It was then found necessary to speed up cards along with the other frames in order to keep up with the work. The result of this additional speed was that the finished yarn presented a very neppy and dirty appearance.

But neps may also be caused by bad card wire and imperfect settings. The greatest possible attention should be paid to the setting of the various parts, and it is advisable to repeat the operation of setting more particularly with regard to the flats, as the alteration of one setting has a tendency generally to affect another. All setting points should be well screwed up, for if this is not done, the various driving bands or straps may pull some of the parts into actual contact.

In setting the flats to the cylinder, a number of practical men hold the opinion that the nearer the flats can be set to the cylinder, the better the result will be. However, the writer's idea is that such a close setting carries with it a very great risk of actual contact which would damage the wire very much, and consequently the fibers would suffer. This is very obvious when we consider the nature of the cleaning surfaces, and also the very delicate structure of the fiber.

Extremely close settings, more especially with heavy carding, may also cut and nep the fiber; whilst on the other hand if we have too wide a setting, dirty and cloudy webs must be expected. It is better and safer to set by gauge and afterwards to turn the cylinder by hand in order to ascertain whether or no there is any rubbing of the altered parts. Attention should be paid to the ends of the flats, and also to the chain which drives them, and if any flats be found with damaged wire they should be removed at once.

In setting the doffer and licker-in it is necessary that they should be positioned perfectly parallel to the cylinder, and at a distance which may be considered best by the person in charge. We shall now direct attention to the feed part of the card, and state that formerly the cotton was fed to the licker-in by means of a pair of feed rollers. But it is now the general custom to dispense with the bottom roller and to use in its stead a feed plate. This is a flat plate curved at its inner end and corresponding to the curvature of the feed roller.

By means of the feed roller and the dish feed plate, the cotton is carried forward and pushed over the latter where it is met by teeth of the licker-in. At this point the greater proportion of the heavier impurities are eliminated as an inspection of the under side of the licker-in will show. The action of the licker-in teeth on the cotton is really a kind of combing. It is therefore, of importance that the greatest care should be taken to set the dish feed perfectly parallel to the licker-in: for if this is set too far away, or in a non-parallel position, which is very often the case, more work will be thrown on the flats; this is undesirable and unnecessary.

The undercasings should also be set close enough to prevent the emission of any good fiber, and at the same time allow the ready fall of any of the heavier impurities.

When uneven slivers makes their appearance, the lap that is being fed to the card should be examined, for it naturally follows that it is impossible to obtain even slivers if our lap is of an uneven character. The main parts of the card should be set perfectly parallel to each other, and it is necessary that all bands and straps should be kept at an even tension.

COTTON COMBING.

(*Contributed exclusively to* COTTON.)

BY H. C. W.

PART III.

The following directions are given as an aid in resetting and erecting the comber, and are in accordance with recommendations by Elwin H. Rooney, master comber of the Whitin Machine Works. They are not hard and fast rules which can be followed in all cases, because conditions largely govern the setting and timing. However, with 1⅜-inch staple Egyptian cotton and a lap weighing 400 grains per yard, and making a 55-grain sliver, the following settings would be satisfactory, and should give about 18 to 20 per cent. waste.

It is assumed that the comber is to be reset and that

all shafts have been removed, and nothing but the framework of the comber is standing. In replacing shafts and setting the mechanisms, the operations should be carried out in the following order:

1. Give the framework a thorough cleaning; clean all shaft bearings and remove all caked grease or oil. Clean the shafts especially where the bearings come and remove all burs and rough places. See that the bolts holding the intermediate stands are all tight. Before replacing the shafts put a drop of oil in each bearing.

2. In reassembling, the shafts can most conveniently be replaced in the following order: (1) Cylinder shaft, coupling to it the short shaft carrying the index gear; (2) The nipper shaft carried in bearings at the base of the intermediate stands; (3) Short driving shaft, carrying the driving pulleys; (4) Cam shaft running in bearings under the sliver table; and (5) Notched wheel shaft.

See that all caps are screwed tightly to their places and that all shafts run freely in their bearings. If a shaft runs tightly or binds, it will wear quickly and consume unnecessary power. Do not set the gears too deep; replace those which are badly worn and broken or which are liable to break.

3. *Set the actuating cams* and in doing so, first put on the pawl arms with the cam rolls on them. Tighten the caps and slide the index gear out of mesh. Turn the cam shaft until the roller on the pawl arm is in the heel of the outside cam or the one nearest the driving pulley. Then turn the index gear until the pointer is at 5, and slide the gear into mesh and bolt it to the sleeve. Tighten all caps and bolts firmly and see that everything works freely.

4. *Set the steel detaching roll.* Examine all of the segments of the cylinder and see that they are smooth and have no burs or scratches to mark or injure the leather roll. Put on the needle half laps after making sure all of the bent needles have been straightened; screw them down firmly.

Replace the small tins and see that they fit closely and are tight. Revolve the cylinder shaft to get all of the half laps to the bottom position, and with all segments up, tighten the set screws on one side. This is not a final adjustment, but is used as a guide for setting the leather detaching roll.

Replace the brass bushings in the detaching roll bearings, being careful to replace them in the correspondingly numbered bearings. Scour the steel detaching roll with pummice, using card clothing for applying it. Wipe well with whiting and replace the roll in the bearings. Also replace the small shaft carrying the horse-heads for brass detaching rolls and screw the caps down firmly.

Turn the cylinder shaft until three-quarters of the surface of the segment has passed under the steel roll; then set the roll to the segment with a 22 gauge. First, set the two middle heads and then the end heads, taking the intermediate heads as it is convenient. This will not bend or buckle the roll. After the roll has been set, examine the settings again and be sure that the pinion on the end of the roll meshing with the internal gear is set for proper running. If it is too loose, set the roll with a 23 gauge. Be sure that the detaching roll runs freely, and then tighten the bearings to the intermediate stands. Tighten the bearing near the pinion and see that the roll turns freely.

5. *Set the cylinders.* Loosen the cylinders and turn the index gear to 5, and set the front edge of the segment 1½ inches from the detaching roll with the cylinders equi-distant from the stands. Tighten the set screws firmly on each side, as this is the final adjustment. Replace the large waste chutes and set each one square and true. See that the cylinders do not rub or strike them. Have the segments down and the half lap up out of the way when making this setting.

6. *Set the draw box rolls.* Scour the draw box rolls and clean the gears. Replace the rolls and gears and connect with the gear on the end of the cylinder shaft. See that all shafts and gears run freely. The fluted bottom rolls should be set as follows:

Between the first and second rolls, the distance between centers should be ⅛ inch more than the length of the fiber.

Between the second and third rolls, the distance should be 3/16 inch more than the length of the staple.

Between third and back rolls the distance should be ¼ inch more than the length of the staple.

7. *Set top comb shaft.* Replace the top comb shaft and screw the caps down firmly. Set the front edge of the shaft 7 inches from the back edge of the steel detaching roll

8. *Set the brush shaft.* Replace the brush shaft in its bearings and screw the caps down firmly. See that the gear on the end of the shaft works freely on the spline. With the traverse motion at half throw, set the brushes equi-distant from the bearings. If the brushes have been running in the same direction for two years or more they should be turned end for end before replacing.

Turn the cylinders until the bristles of the brushes are entering the fifth or sixth row of needles, and set the brushes so that the bristles rub the brass foundations. The brushes keep the half laps clean. Care should be taken to have them set properly, as dirty half laps will not give good results. Connect up the driving gears for the brush shaft. Three different speeds are obtainable to compensate for the wear of the brushes.

9. *Set the feed roll.* Scour the feed roll well and set it with a 3¾ inch gauge, for short staple, and 2 inches for long stock, from the steel detaching roll. First set the two middle bearings and then the end bearings. Replace the cross shaft driving the lap rolls and see that both the shaft and feed roll turn easily.

10. *Set the leather detaching rolls.* Put the leather detaching rolls in place and see that all of the flat sides of the bushings bear against the adjusting blocks. Put the hooks in place on the bushings and hang the weights. See that the weights hang free and even. Remove the weight hooks from the rolls and turn the cylinder until the index gear stands at 8. Set the adjusting blocks from the flat side of the bushing with a 25 gauge. Set each side as nearly the same as possible, so that the roll will bear evenly on the segment at all times. Tighten the cap screws and check nuts and examine with the gauge again.

11. *Setting the nippers.* Take all nipper frames to the bench and after cleaning all of the lint and oil from the cushion plate and fiber packing, place the frame in the vise. Set the edge of the cushion plate to the nipper knife with a 23 gauge and tighten the cap screws, so that the cushion plate is held firmly in place. Be sure that the nipper knife is straight and true.

Then set the cushion plate to the knives so that paper will pull evenly across the plate. To do this it may be neces-

sary to file the nipper frame in places to allow the cushion plate to bear evenly on the fiber packing all the way across. Any adjustment which will give the desired result and yet not change the other adjustment may be resorted to. Then place the frames on the floor in the proper order and connect them with the nipper stands. Slide the feed roll into place in the brackets and lift all together into place on the machine. See that all stands sit down properly and that the feed roll drops into its bearings. Then tighten the bolts in the nipper stands slightly.

Give the nipper knives an angle of 34 degrees for short and 40 degrees for long staple, by adjusting with stop screws in the nipper bracket arms. In making this setting always start at the center of the machine and work towards the ends using only the front stop screw nearest the center in each head. Be sure the other stop screws are all loose and do not bind.

Tighten the check nuts on the stop screws slightly, except those on the two ends heads. These should be well tightened; under no consideration change the angle of these two knives. If you wish to determine at what angle the knives of any comber have been set, always go to the end heads and never to an intermediate head, the reason for which will be explained later. This angle remains the same regardless of the horizontal or vertical position of the frames and can not be changed without an adjustment of the stop screws.

Next set the edge of the cushion plate 1¼ inches from the steel detaching roll for short stock and 1-7/16 inches for long stock, by moving the nipper stand up or down on the incline of the intermediate stand. At the same time set the cushion plate to the segment with a 19 gauge by raising or lowering the nipper frame or bracket by means of the adjusting screws. Both of these settings should be carried on at the same time. Start at the middle of the machine, setting the two middle heads. Then go to the end heads and set the four remaining heads. Under no consideration change the angle of the two end knives.

In setting the four remaining heads, it may be necessary to slightly change the angle of the knives to properly set the cushion plate. The person doing the work will have to depend upon his own judgment in many cases as to what to do. This setting should be gone over two or three times, and care should be taken to see that any adjustment of one head does not change the adjustment of the one on either side of it. Setting the cushion plates to the segments merely levels the frame as they have to be set to the needles later on. In setting the cushion plates to the segments, have the nipper knives raised.

Next set all of the front stop screws that are not already tightened to those which have been tightened, so that both will pull paper alike. Then tighten all check nuts up firmly and see that the adjustments remain the same. This adjustment causes both screws to strike the stands at the same time and keeps the cushion plate and knives level and parallel.

Next connect the nipper brackets and the nipper shaft by the connecting rods N. See that the rods enter the swivels and that the pins all enter the holes easily. Next turn the comber until the dial is at 14¼. At this place the first row of needles on the half lap should be pointing towards the center of the steel detaching roll.

Then see that the roll is in the high part of the nipper cam and that the adjusting nut on the nipper cam is above the cam shaft. If this nut is below the shaft, turn the comber over until 14¼ comes opposite the dial, and this will bring the nut above the shaft. This is only to make the setting of the nipper cam a little more easy to accomplish.

Then set the nipper brackets, with the knives down on the cushion plate, to the half lap with a 20 gauge by the adjusting screws. This is the final setting of the cushion plate and nippers. Care should be taken to see that all check nuts, screws and bolts are well tightened.

When setting to needles of any description never pull the gauge through when it binds. Loosen somewhere and then reset. If the gauge pulls hard on the needles they are liable to break or have the points damaged and their working qualities injured.

Next place a 25 gauge under the stop screws, and adjust the nuts on the connecting rod N, until the pressure is relieved, so the gauge can be drawn out. Set both sides so the gauge will draw out with the same pull; then tighten the nuts up tight. Try the gauge again and reset if the setting has been disturbed.

After setting the eight heads in this manner, having the gauge draw from each of the heads with as nearly the same pull as possible, tighten the back stop screws in the back arms of the nipper brackets.

In tightening these screws care should be taken not to break the arms of the bracket. If they are tightened with the fingers and then set up a slight amount with the wrench and the check nut well set up, it will usually be found sufficient.

Now turn the index gear to 11 and set the nipper cams so that the knives touch the cushion plate. Do this by moving the cams on their sleeves.

12. *Set the top combs.*. Turn the comber until the index gear is at 8. Then the segments should be at the top. Put the top combs in the top comb arms and loosen the stop screws. Remove the two back bolts holding each top comb to the arms and loosen the two front ones.

Set the leather detaching roll in place, and with a piece of tin between it and the steel detaching roll, set the top comb at an angle of 27 degrees, holding it square against the surface of the leather roll. First, tighten the bolt nearest the angle gauge and then the bolt on the other side. Then return to the bolt first tightened and loosen it up and then retighten. This avoids any tendency of the comb to cramp.

Replace the two other bolts and tighten them. Next set the comb from the segment with a 22 gauge by means of the stop screws. If double top combs are used, see that the tin strips, holding one set of needles, stand about 1/32 of an inch further down than the fixed needles.

13. *Set the brass clearings or detaching roll.* Set the brass clearing roll so that the flutes are parellel with those of the steel detaching roll. Set the roll from the leather roll, with an 18 gauge.

The brass rolls have a certain amount of tension applied to them to keep the flutes from skipping over those of the steel roll. It is supplied by two small springs which act on the horseheads, tending to keep the brass roll from jumping. If these springs become clogged with waste or dirt their working qualities become of no value and the roll will jump and skip, due to the high speed at which it runs.

14. *Set the lap aprons.* With index gear at 14¼, set the lap aprons so that the brush on the end of the apron

strikes into the roll. Also have the surfaces of the aprons parallel with the feed rolls, with the aprons set firmly in place.

15. *Set the top feed rolls.* Put the top feed roll for each head in place and set them so that the flutes are parallel with those of the bottom rolls. To do this move the top feed roll arm forward or back the required amount. Put on the springs and take up about ¼ of an inch after the spring becomes tight.

16. *Set the doffer and doffer comb.* Place the doffer shaft in its bearings and set the doffers about 1/32 of an inch from the brushes. If the doffer is set too close and strikes the brush, the waste will be nepped. Set the doffer comb 1/32 of an inch from the doffer and see that all waste packers are tight in the comb arms. Put the doffer covers on and set them so that they will clear the cylinders, brushes, and doffers.

Set the covers close to the doffers at the back side. This reduces the amount of fly thrown out around the room.

17. *Timing the feed roll.* Set the plate carrying the pin so that it enters the star wheel and just starts to turn it when the dial is at 6.

18. *Timing the detaching roll.* Adjust the large cam on the end of the cam shaft so that the detaching roll starts to move forward at 6. Then turn comber over and set the inside detaching cam so that the roll starts to move forward at 6. Tighten the bolts up hard, as any loosening or movement of the parts adjusted will cause a rattling of these parts and give poor results.

This completes the resetting of the mechanism of the comber, but there are a few things on the care of the machine of which it might be well to speak. All the principal bearings should be oiled once a day and the small or minor bearings once every other day. When starting up a comber after resetting, always grease the gears and keep them greased.

The detaching roll bearings should be kept well oiled and clean. Leather rolls should be buffed and varnished once a week. If the leather rolls become soft or uneven across the face, a poor piecing will be made and the web will have a curled uneven appearance. Curled webs are produced also by a dry detaching roll bearing and poor setting of the detaching roll.

The cylinder brushes should be cleaned or stripped out once every two weeks by a fork made especially for the purpose.

The percentage of waste may be determined approximately in the following manner:

Break the end close to the bite of the calender rolls; cut the web from the brush doffer under the comb; start the comber and allow it to run one or two minutes, and then break the end as before and also cut the web. Add the weight of the sliver and waste and divide the weight of the waste by the sum. This does not require much time, and percentages can be taken from different heads on the same comber or from different combers, and a close watch thus kept of what a machine is doing.

Thus it will be supposed that you run the comber for one minute and find that 420. grains of sliver were produced and 98 grains of noil. $420 + 98 = 518$ grains.

Then $98 \div 518 = .19$ or 19 per cent. noil.

The waste may be increased by setting the top combs closer to the segment, by increasing the angle of the top comb, by increasing the angle of the nipper knife, by a later nip and by a later feed. It is better to set to a fairly loose gauge rather than to a tight one. That is, set so that you can feel the gauge draw just a slight amount, rather than pull hard, between the parts being adjusted.

THE SETTING OF HARNESSES ON A PLAIN LOOM.

D. W. L.

The setting of the harnesses in the loom is a very important feature in the weaving department. The mill officials want a smooth face cloth and selvage in all cases, and this cannot be made unless the harnesses are set properly. It is also important that a fixer use the least possible supplies on his loom, and at the same time make them run satisfactorily.

If the harnesses are not set right, the loom will break up more supplies than there should be any occasion for. The least power with which a loom can be operated is the best, and if the harnesses are too high and shed too close, it will take much unnecessary power on the picker stick. And not only that, but the shuttle will fly out more or less and sometimes get broken. Very often the shuttle will break out the warp fifty per cent. worse than it would if the harnesses had been set right.

The writer considers the setting of the harnesses a very particular part in loom fixing, and thinks that the best way to set the harnesses for plain goods is as follows: First, the larger cam must pull the back harness down and the smaller cam pull the front one down. The harnesses should be level with the reed about three inches from the fell of the cloth. They must be pulled down so that the warp will almost touch the race board when each harness is in its lowest position. The back one should be a trifle higher than the front one. The harnesses must be strapped up so that when one is down the other will raise the top shade, so the shuttle will pass through the shed clear from one box to the other.

When this is the case there is no need of extra power on the picker stick. If more power is required you can loosen up the shuttle boxes, and if they are in line with the reed, and the lay is level, the shuttle will not be thrown out. The loom should pick with the crank just a trifle in front of top center with the pick ball or knob at the lowest place in the cam point. The picker should be parallel so as not to raise the shuttle when it starts out of the box. The filling stop motion is an important feature in running a loom. The let-off motion cannot be made to work properly unless the harnesses are set right, because the harder the warp presses against the whip roll the faster the let-off motion will operate, and if one harness pulls down on the whip roll harder than the other the let-off will strike a long lick one time and a short one the next time.

That repeated experiments with arsenate of lead have proved that this chemical is the one protection against the boll weevil is the assertion of Wilot Newell, secretary of the Louisiana Crop Pest Commission. Secretary Newell has issued a bulletin advising cotton planters to employ this preparation.

During the past 18 months there has been a rapid change from the use of short staple cotton to long staple, the mills in many instances changing machinery.

WOOL MANUFACTURING.

SOLEIL WEAVES.

PRINCIPLE OF CONSTRUCTION. STRUCTURE OF THE FABRICS. METHOD OF OBTAINING ORNAMENTAL EFFECTS.

(Contributed exclusively to COTTON.)

BY EMIL KAHN.

This name is applied to a popular type of ladies' dress fabrics, which in general appearance closely resemble a regular double satin weave, but are of a much firmer construction. The threads when not floating or forming the face of the goods, interlace on the back in a plain weave order. The nature of the weave is such that it may be classed with the double cloth structure. In double cloth weaves two sets of warp threads are required on account of the difference of "take up" during weaving. Each

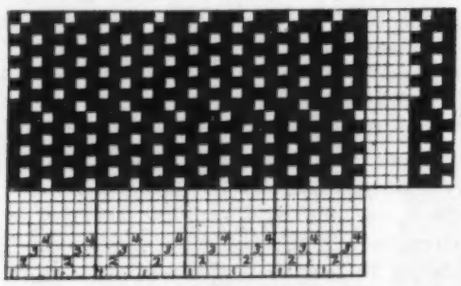


FIG. 1. DESIGN AND DRAFTS FOR A REGULAR SOLEIL WEAVE.

set of warp threads in double cloth structures are usually on separate beams. In soleil weaves, however, only one set of warp threads is received, as all of the threads have the same amount of take up during the process of weaving.

The soleil weave is applied to various combinations of materials, ranging from a fine silk warp with fine worsted filling, and fine worsted warp and filling to various counts of cotton in both warp and filling. The fabric is exclusively used for ladies' dress goods, and is admirably adopted for that purpose, but a very high warp texture is required in order to get perfect results. The peculiarities of the soleil weaves are the stripe effects running horizontally and also diagonally across the goods. This stripe effect is often elaborated by using different colored warp yarns using them alternately in the warp; also some other kind of weave. Very pleasing effects, may also be obtained in either yarn dyed or piece dyed fabrics.

The formation of the stripe is effected entirely by the weave. As already mentioned the warp threads are made to float over a given number of picks, then are interlaced with the filling on the plain weave order. This naturally tends to depress the warp thread at this point or bury it so to speak, while the adjacent thread commences floating when the first thread starts to interlace with the filling. The idea of the construction is made clear in Fig. 1, which is the design, drawing-in draft and harness chain for a soleil weave. This weave repeats on 4 ends and 16 picks. Ends No. 1 and 3 will lie close together in the cloth from the first until seventh picks, whereas end No. 2 will be buried beneath them in the same space in the cloth. Ends Nos. 2 and 4 will from pick No. 8 to 15 lie close together and bury ends No. 3 in that place. Fig. 2 is a sample of cloth that was produced by using the weave shown in Fig. 1.

The analysis of a fine worsted soleil weave is as follows:

Width in reed, 60 inches.
27 reed, 4 ends per dent.
108 ends per inch in reed.
2/90s worsted warp—"in grease."
1/40s worsted filling—"in grease."
80 picks per inch in loom.
Finished width of fabric, 54 inches.
Fabric dyed in the piece.

While perfectly plain soleils have been quite popular, the present demand is for fancy effects, that is, solid weaves elaborated by means of different colored warp yarn, or the soleil weave used in connection with some other kind of weave, producing in the fabric vertical stripes

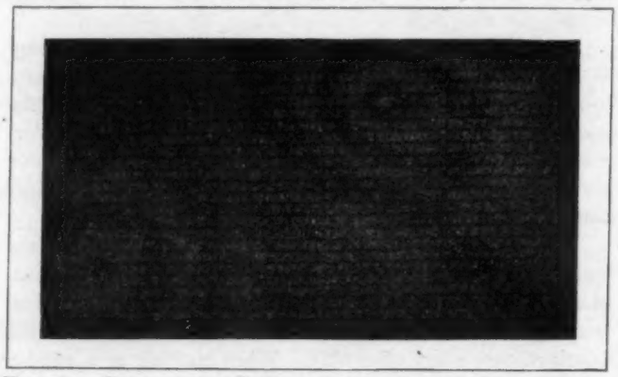


FIG. 2. SAMPLE OF SOLEIL CLOTH MADE FROM DESIGN FIG. 1.

which tend to break the monotony of the horizontal stripe effect of the soleil weave.

Fig. 3 is a sample of fabric of a plain soleil weave elaborated by means of two different colored warps, one end of black and one end of green alternating throughout the full width of the goods, producing alternate stripes of black and green running horizontally across the fabric.

Fig. 4 shows a soleil fabric in which a basket stripe weave is used at regular intervals, forming vertical stripes in the fabric. Fig. 5 illustrates the design, drawing-in draft and harness chain required to produce the fabric shown in Fig. 4. Vertical stripe effects may also be ob-

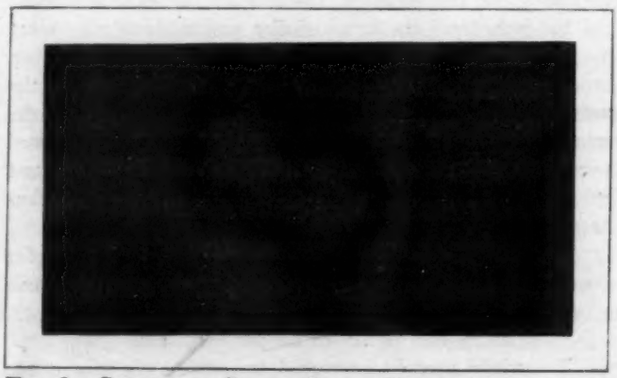


FIG. 3. SAMPLE OF SOLEIL CLOTH HAVING TWO COLORED WARPS.

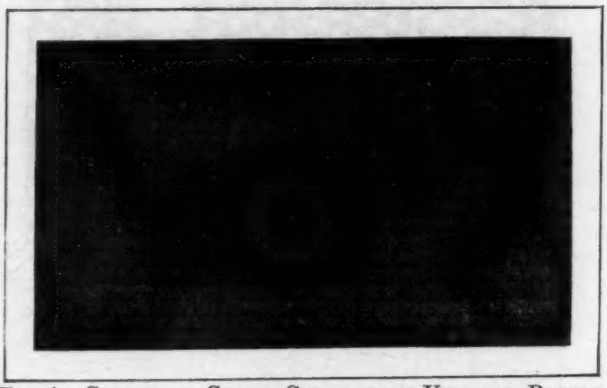


FIG. 4. SAMPLE OF SOLEIL CLOTH WITH VERTICAL BASKET STRIPS

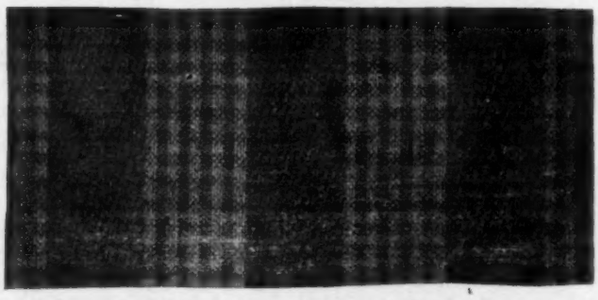


FIG. 6. ORNAMENTED FABRIC, USING THE SOLEIL WEAVE.

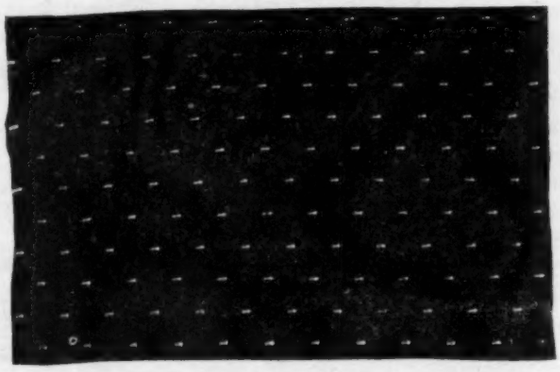


FIG. 8. SAMPLE OF SOLEIL CLOTH ORNAMENTED BY FANCY FILLING.

tained by means of different colored warp threads varying in number from two to ten, according to the prominence of the stripe desired.

The warping plan for such a fabric is as follows:

40-ends "in grease" worsted.
10- " black and "in grease" worsted twist.
40- " "in grease" worsted.
2- " black worsted.

92-ends total in repeat of pattern.

This fabric is dyed in the piece, say with a maroon colored dye, the black threads resisting the dye, thereby giving the vertical stripe effect. Ornamentation of soleil weaves along lines above suggested is practically unlimited. A rather effective treatment of the soleil weave is shown by Fig. 6. This is a yarn dyed fabric, constructed almost entirely of cotton. In this sample the vertical stripes are much more pronounced than the horizontal stripes. The check stripe is a plain weave, whereas the solid colored stripe is a soleil weave. The analysis follows:

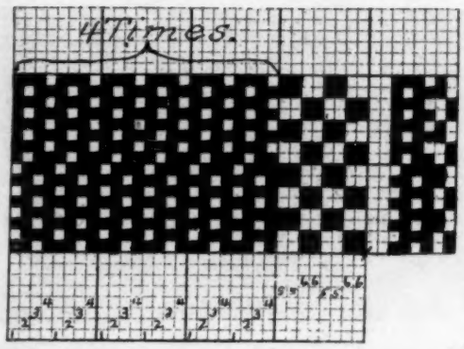


FIG. 5. DESIGN AND DRAFTS FOR CLOTH SHOWN IN FIG. 4.

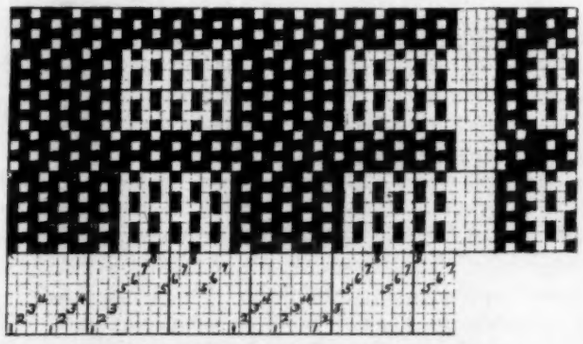


FIG. 7. DESIGN AND DRAFTS FOR A CHECK EFFECT WITH SOLEIL WEAVE.

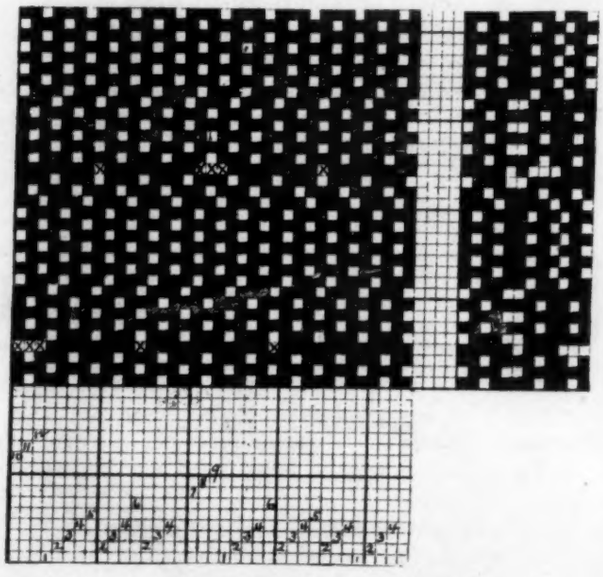


FIG. 9. DRAFTS FOR THE SAMPLE FIG. 8.

Width in reed = 47½ inches.
Reed = 19½ × 4 × 3
2/40s cotton warp.
1/20s cotton and 1/30s worsted filling.
56 picks per inch.
Finished width, 44 inches.

WARPING PLAN.

48 ends medium brown = 4 ends in one split in reed.

4 × { 4 ends light brown, 4 ends medium brown, 4 ends light brown } = 3 ends in one split in reed

84 ends, total in one repeat of pattern.

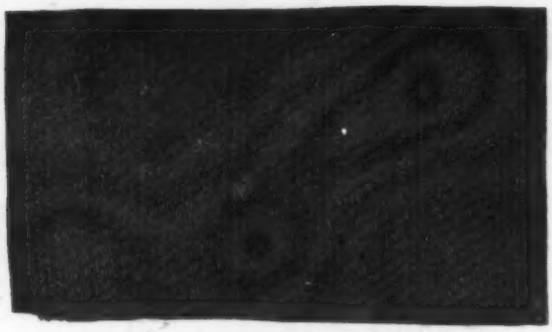


Fig. 10. Sample of Soleil Cloth, Showing Diagonal Effect.

The check effect or the plain weave portion of the fabric is reeded three ends in one split of the reed, whereas the plain colored stripe or solid weave is reeded four ends in one split, consequently the 36 ends forming the check effect stripe requires as much reed space as the 48 ends of the soleil weave. This difference of reeding is, however, only practical when using the plain weave in connection with the soleil weave, as the intersections of the warp and filling in a plain weave are twice as many as in a soleil weave repeating on eight picks. The great number of intersections in a plain weave as compared to the soleil weave would, if reeded four ends in one split, weave very hard, chafe and break out the ends; whereas reeding the plain portion three ends in one split allows sufficient space for the intersections, and also tends to equalize the take-up during weaving. Consequently patterns of this character when reeded as above are practical on one beam.

A stripe and check effect may also be obtained entirely by the soleil weave; these are usually made in piece dyed fabrics. The design, drawing-in draft and harness chain are given in Fig. 7. A given number of ends operates on the first four harnesses and produce the stripe effect,

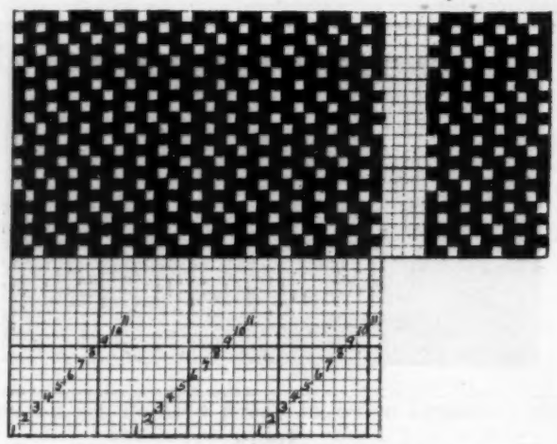


Fig. 11. Design and Drafts for a Diagonal Effect, Soleil Weave.

whereas the harnesses Nos. 5, 6, 7 and 8 operate certain threads to form the check effect. Care, however, must be taken to get the best possible joining of the two effects, or the stripes will have a ragged appearance on their edges.

Another means of ornamentation consists in inserting at certain intervals a pick of high colored or fancy filling, making the same come to the face of fabric according to some design in a spot effect as shown by the sample in Fig. 8. Fig. 9 shows one repeat of the design, with the drawing-in draft and harness chain, the three adjoining, crosses indicating the fancy filling on the face of the fabric. The single crosses are for stitching purposes.

Soleil weaves in which the stripe effect runs diagonally across the fabric are based on the same principle as the horizontal stripe effect. This style of pattern may be entirely plain, or broken by vertical stripes, as in the sample of a fabric shown in Fig. 10. The design, drawing-in draft and harness chain for this weave are given in Fig. 11.

KNITTING

SPRING NEEDLE KNITTING MACHINES.

Troubles Encountered—Their Effects, Causes and Remedies.

(*Contributed exclusively to* Cotton.)

by ernest tompkins.

PART II.

In this discussion we shall assume that different troubles occur on the knitting machine that cause bad work. The different causes of the trouble and the remedies will then be given.

(1) We will suppose that tucks are made in a vertical line.

Cause.—The needle beard is low so that the yarn is split and part remains on the outside of the beard.

Remedy.—Replace the needle.

Cause.—The needle is bent inwardly so that it is not completely pressed.

Remedy.—Bend it outwardly.

Cause.—The needle is loose in the lead or trick.

Remedy.—Replace if leaded, or renew the leather if trick.

Cause.—The needle is weak, owing to deficient temper, so that it bends away from the presser.

Remedy.—Replace the needle.

Cause.—A mote or seed is lodged in the head of the needle, so that the stitch will not cast off readily.

Remedy.—Remove obstruction.

(2) We will suppose that single drop stitches occur.

Cause.—The sinker bur is clogged with lint so that the beard is pressed down and the yarn can not get under it. (If successive spaces are clogged a succession of drops will be caused.)

Remedy.—Clean sinker bur.

Cause.—The sinker bur is so tight that the blades brush a beard down so that the yarns can not get in under it.

Remedy.—Readjust the sinker or use one that runs more freely.

Cause.—The yarn is dropping out from under beard

after leaving sinker or running out of the yarn groove on the sinker bur.

REMEDY.—See "Series of drop stitches without a break in the yarn," published in March, 1910, on page 239.

The effect of these troubles is generally a series of drop stitches but it may be a single drop stitch at intervals.

(3) We will next consider rows of tight stiches are made.

CAUSE.—The guide is clogged with lint. This may make a number of courses of tight stitches before the yarn breaks or the lint pulls through and runs into the needles.

REMEDY.—Clean the guide and polish the periphery of the hole or enlarge the hole.

CAUSE.—The pull from the bobbin may be the trouble which could be caused by (1) a rough barrel, in which case replace the bobbin; (2) Some coils pulled in under others, in which case use a quicker traverse or more tension on the winder; (3) Incorrect distance from the thread eye, so that delivery is not free, in which case elevate or depress so that delivery is freest; (4) The bobbin is not directly under the eye, in which case place the bobbin so that the yarn delivery is the same all the way around.

CAUSE.—The pull from the cone may be the trouble which could be caused by (5) Wrong position as in 3 and 4, in which case the same remedies would be applicable; (6) The yarn friction on the side of the cone, (not due to position.) in which case use a cone with more taper, or increase the speed of the knitting machine; (7) Knot or seed on the side of the cone, in which case remove the seed or turn the machine by hand until the obstruction is out of the way; (8) Underwinds, in which case, improve the winding.

CAUSE.—The sinker bur is cramped so that the blades bind the needles and push them inwardly so that they can not take the full stitch.

REMEDY.—Readjust the bur or replace it with one properly designed for the conditions.

(4) Now assume that the beards of the needles are being broken off:

CAUSE.—The stop motion claw may be so close to the needles that it catches a high beard.

REMEDY.—Draw the claw back.

CAUSE.—The toe of the flat presser is so sharp that it gets in under a high beard.

REMEDY.—Round the toe of the presser.

CAUSE.—The cast-off is so far through the needles that it pushes the stitch out against the beards and breaks them off.

REMEDY.—Move the cast-off inwardly.

CAUSE.—The presser is so hard that the beard is pressed down flat and breaks at the head or cramp.

REMEDY.—Press lighter or farther toward the point of the beard.

CAUSE.—The guide is too close to the needles.

REMEDY.—Move the guide out.

CAUSE.—The sinker bur backs out for a bunch and does not return fully to position.

REMEDY.—Tighten the spring in the sinker tube.

CAUSE.—The guide strikes sinker causing it to over reach.

REMEDY.—Move the guide away, or if it is too flexible to retain its position against the tension of the yarn, use a heavier guide.

(5) We will next consider that the needles are breaking at the lead or trick.

CAUSE.—The lander bur is over-reaching so that blades buck needles.

REMEDY.—Set the lander to run tighter in the needles.

CAUSE.—The presser is in too deep, bending needles too much.

REMEDY.—Press lighter.

CAUSE.—The needles are too short. Occurs when yarn is heavy or wiry, and stitch is long as in knitting linen or ramie.

REMEDY.—Use longer needles.

CAUSE.—The cast-off is set so tight as to snap the needles as they leave.

REMEDY.—Set the cast-off looser.

(6) We will next consider that tucks are made at random.

CAUSE.—The round presser is nicked by bruise or by striking the lander blades so that it acts as a tuck presser.

REMEDY.—Turn down the presser.

CAUSE.—A bent blade in the sinker is brushing down a needle beard occasionally so that the yarn comes up outside of the beard.

REMEDY.—Replace blade.

CAUSE.—The cast-off blade is broken or out so that the stitch is not cast off.

REMEDY.—Insert a blade.

(*To be continued.*)

AN IMPROVED LOOPER.

This looper is of the point-ring type and is designed for the finishing of knit webs provided at one or more

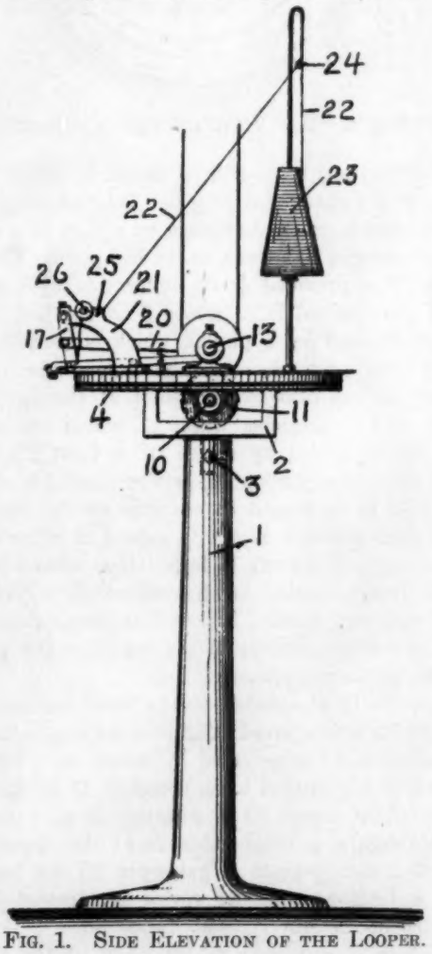


FIG. 1. SIDE ELEVATION OF THE LOOPER.

edges with a series of unconnected loops. The operative parts of the machine are so arranged as to permit free access to the needle and looper, and at the same time to all parts of the point-ring. The output of the machine will thus be materially increased, owing to increased facility and consequent rapidity with which the sewing operation can be effected.

The motion-transmitting mechanism is so arranged as to be readily accessible for lubrication, and at the same time out of the way of the operator while working upon the machine. The details of the machine are best explained by means of the accompanying illustration, of which Fig. 1 is a side elevation of the machine. Fig. 2 is a top view of the machine and Fig. 3 is a vertical section through the looping mechanism.

Referring to the drawings, 1 indicates a standard upon which the operating mechanism of the machine is supported. A yoke 2 is mounted on the top of the standard and secured thereto by a set-screw 3, said yoke supporting the bed-plate 4 of the machine. This bed-plate is pro-

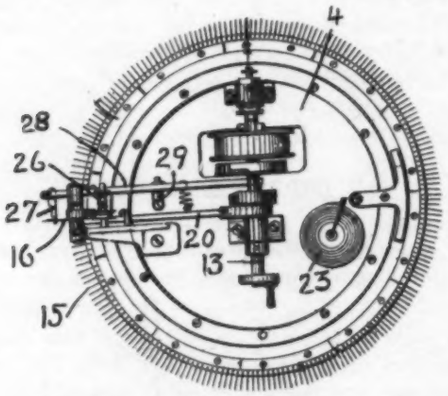


FIG. 2. TOP VIEW OF THE MACHINE.

vided near its periphery with a flange 5, which forms a bearing for a looper-point ring 6. This looper-point ring is secured rotably to the bed-plate by means of a stay-ring 7, which is secured by screws to the bed-plate. The looper-point ring 6 is provided at its under side with rack-teeth 8, which are received in a groove 9 of the bed-plate and which are engaged by a pinion, which is mounted on the shaft 10 supported in bearings below the bed-plate. The shaft 10 has also secured to it at the opposite end from the pinion, a ratchet wheel 11, which receives intermittent rotary motion by means of a pawl 12, which is mounted eccentrically upon the driving-shaft 13. The driving-shaft 13 is supported in bearings on the bed-plate 4, being of such a length as not to extend at either end over the point-ring. The shaft 13 is provided with a pulley 14, to which rotary motion is transmitted by a driving-belt from an overhead shaft. The vertical looper-points 15 are secured in position radially of the bed-plate and point-ring by segmental clamping-bars.

The needle 16 is mounted on the lower end of a needle-arm 17, which is fulcrumed at 18 in a stationary bracket 19. The needle-arm 17 is actuated by means of a connecting-rod 20 which is strapped to an eccentric 21 on the driving-shaft 13. The thread 22 is supplied from a bobbin 23, passed through a suitable guide 24 at the upper part of the spindle, then beneath a guide-pin 25 the bracket 19, through a tension-regulating device 26, around the lower end of the needle-arm 17, and thence through the needle-eye, which is in proximity to the point of the needle 16.

Co-operating with the needle is a looper-hook 27, which is actuated by means of a universally-pivoted operating-arm 28, said arm being pivoted to swing vertically upon a bracket 29 and the latter pivoted to swing horizontally upon the bed-plate. The inner end of the arm 28 is provided with a laterally-projecting pin 30, which is held in contact with the face of a suitably-formed cam 31, secured upon the driving-shaft 13.

A stationary guard 32 is arranged at a point adjacent to the ends of the looper-points below the needle, so as to prevent the forcing of the loops of the fabric off the points by the needle during the operation of looping. To prevent the momentum of the intermittently-rotating looper-joint ring 6 from being carried beyond the point to which it is moved by its actuating pawl-and-ratchet device, a brake mechanism is provided which bears on the looper-point ring.

The operation of the machine is as follows: The fabric having at its edge the unconnected loops is placed upon the machine by placing the successive loops upon the successive looper-points. The looper-point ring is rotated intermittently by means of the pawl-and-ratchet mechanism previously described, the intermittent motion taking place while the needle is oscillated in backward direction—that is to say, toward the center of the machine. The looper-point ring 6 having been moved so as to bring a fresh loop into the path of the needle 16, the latter advances, enters the loop so as to carry the thread through the same, and then withdraws, the further operations during the advance of the needle and thereafter being performed co-operatively therewith by the hook 17, said steps of intermittent feed of the point-ring and advance of the needle and co-operation of the hook being successively repeated, whereby a continuous edge is formed on the open loops of the fabric.

The following are some of the advantages claimed:

First. A great degree of accessibility is provided to all parts of the machine and in particular to those parts adjacent the needle, whereby the operator is enabled to take his position directly in front of the needle and looper.

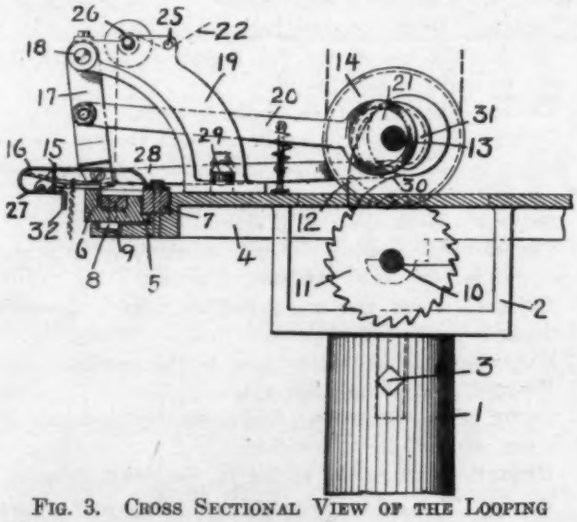


FIG. 3. CROSS SECTIONAL VIEW OF THE LOOPING MECHANISM.

Second. When sewing together two separate knit fabrics, two operators may be continuously and simultaneously employed on one machine. In such case one operator is located directly in front of the hook and needle and the other at a point diametrically opposite thereto.

DYEING, BLEACHING AND FINISHING

SYSTEMATIZING THE BLEACHERY.*

BY H. L. GANTT.

The textile industry enjoys the distinction, to a greater extent, perhaps, than any other, of having been brought to a high state of perfection without the aid of the mechanical engineer. The machinery was developed by the mechanic before the mechanical engineer became a very important factor in the industrial world, and the plans were, and are still, made by mill architects, who as their name implies are architects rather than engineers. The most important field of this industry that the engineer has entered is the power department, and in this field he has done much good work. The complicated and delicate machines for working cotton fiber which are wonders of mechanical skill, have, however, been brought to their high state of perfection by men who were mechanics rather than mechanical engineers. The operation of these machines, until recently, has been directed by men whose training was exclusively that of the factory, and who could solve well a concrete problem.

In this industry there is, as a rule, a wider gap between the financial interests that control, and the "help" that operate, than there is in almost any other industry. The textile schools are to-day doing much to fill the gap by supplying to the mills educated men who, while understanding the detail operation of the machines, are capable of comprehending the larger problems of management, and can thus form a link between the financial men that control and the mechanics that operate. The lack of such men in the past is undoubtedly responsible for the fact that some of the processes which influence the subject of management more than they do the product, and which are easily susceptible of being standardized and done automatically, are still being done expensively and inefficiently by hand, and in a manner that causes much subsequent labor and expense that should be avoided. The solution of this problem belongs more particularly to the function of management, for the workman often does not see the influence of one process on a subsequent one in another department.

I refer, for example, to the process of handling cloth in a bleachery. In the process of bleaching, cotton cloth is generally sewed together, piece by piece, and handled in the form of a rope which is drawn from one operation to the next by means of rolls. This rope of cloth is subjected to the action of various liquids, being first boiled in an alkali and then washed. After being washed it is usually impregnated with acid (technically "soured"), and allowed to stand in a pile for some minutes to allow the acid to act.

The methods of forming this pile and of withdrawing the cloth from the pile, are the operations to which I have special reference. As the piling operation is repeated after each of several impregnating operations, the successive pilings divide the process into a series of separate and distinct stages with a loss of time between every two. The usual method of piling is as follows: The cloth is drawn from the souring machine by an overhead roll, which drops it to the floor beneath. A boy stands on the pile of cloth and so guides it with a stick that it is piled in substantially uniform horizontal layers. When the pile has reached a size determined by the judgment of the bleacher (or the boy), the rope of cloth is broken at a seam and a second pile is formed. When in the judgment of the bleacher the first pile has stood long enough, the cloth is withdrawn and pulled through a washing machine into a bath of chlorine water (technically "chemic"), after which it is again piled in the same manner by a boy with a stick. The judgment of the bleacher as to the time the cloth should lie in a pile after impregnation seems to be controlled by his temperament, or by tradition, rather than by knowledge, for we find that hardly any two bleachers have the same opinion as to how long the cloth should be subjected to the action of the acid; and the practice varies from a few minutes to twenty-four hours. As a matter of fact the acid does all of its work in ten minutes or less, and no beneficial effect can be discovered by a longer treatment.

Inasmuch as it is necessary to pull the cloth from the top of a pile, the leading portion as it leaves the sour pile has been acted upon by the acid for a shorter time than that at the bottom of the pile. The top of the second pile is attached to the bottom strand of the first pile, and the top of the third pile is attached to the bottom of the second. As each strand of cloth usually goes through several pilings in the course of being bleached, the action of the bleaching liquors on any portion of the cloth would be alternately long and short, according as that portion of the cloth was at the bottom or the top of a pile. If the rope of cloth was always broken in the same place, the worst that could happen would be an unevenness in the

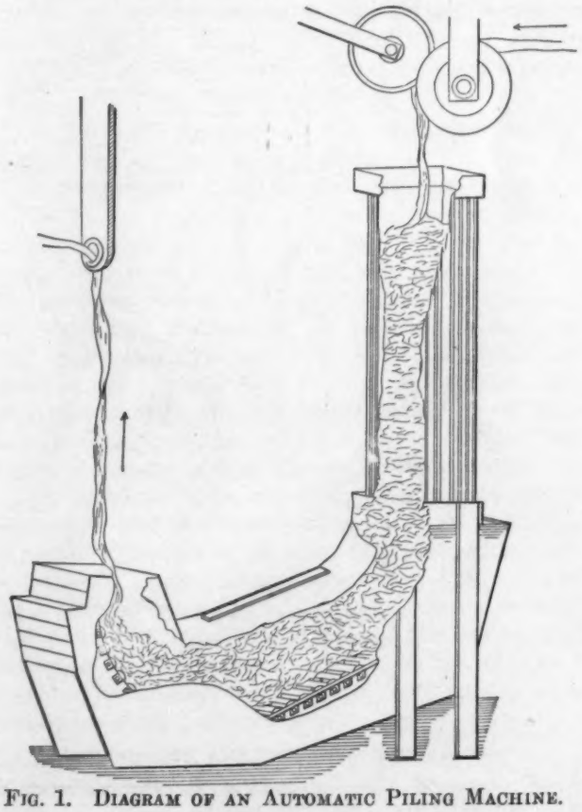


FIG. 1. DIAGRAM OF AN AUTOMATIC PILING MACHINE.

*Read before the American Society of Mechanical Engineers.

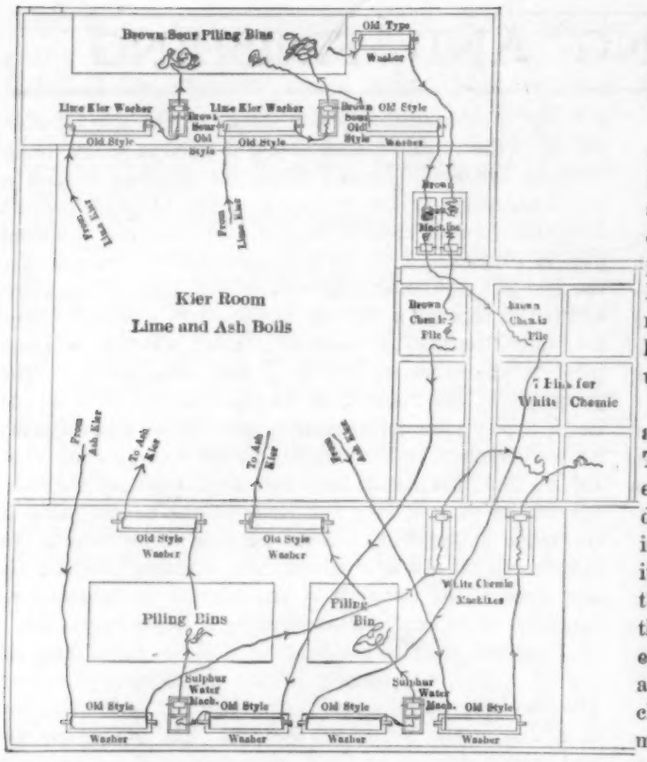


FIG. 2. ARRANGEMENT OF A BLEACHERY (OLD SYSTEM).

bleach due to the difference in treatment. It frequently happens, however (and this is more often the case than not), that the rope of cloth is not broken in the same place; and when this occurs the various lots of cloth of which the rope is composed, which usually belongs to different customers become almost hopelessly mixed. The expense of straightening out such a mix-up has usually been considered one of the legitimate expenses of bleaching. Add to this the fact that the piling boy often piles the cloth so carelessly that it tangles as it is pulled off the pile, and not only damages itself, but usually shuts down a portion of the plant for awhile.

If we also realize the fact that chlorine, or "chemic," not only forms a most unpleasant atmosphere to work in, but is actually injurious to the lungs, it would seem that some automatic piling machine which would hold the required amount of cloth and permit the leading end of the pile to be withdrawn would long ago have been devised. Inasmuch, however, as this is not a problem requiring great mechanical skill, but one requiring a somewhat different kind of knowledge, it apparently had never been attacked until the writer came in contact with it.

Fig. 1 shows a diagram of the machine and the cloth as it is delivered to and withdrawn from the machine. The machine consists of an inclined chute with upturned ends, and having a bottom composed of a series of independent rollers, free to revolve. The cloth is dropped into the tall stack, and falling on the rollers is carried by its own weight to the bottom of the incline. The incline is thus filled, and as the fabric rises in the receiving stack, the forward end of the pile is forced upwardly in the other end of the machine, from which it is pulled off at the rate at which it enters the receiving stack. By making the chute of the proper length a pile of cloth of any size may be held, and the cloth may be subjected to the action of the impregnating liquor for any desired time, all portions of the fabric receiving exactly the same treatment. Such action produces uniformity of bleach which is impossible under the old conditions, and as there is no need for breaking seams, the goods go through the bleach house in the order they went in, which produces a saving of expenses and worry realized only by the man who has operated under both methods. The straightening out of "mix-ups" and the "closing out" of "short lots" are the bane of a finisher's existence, and anything that reduces

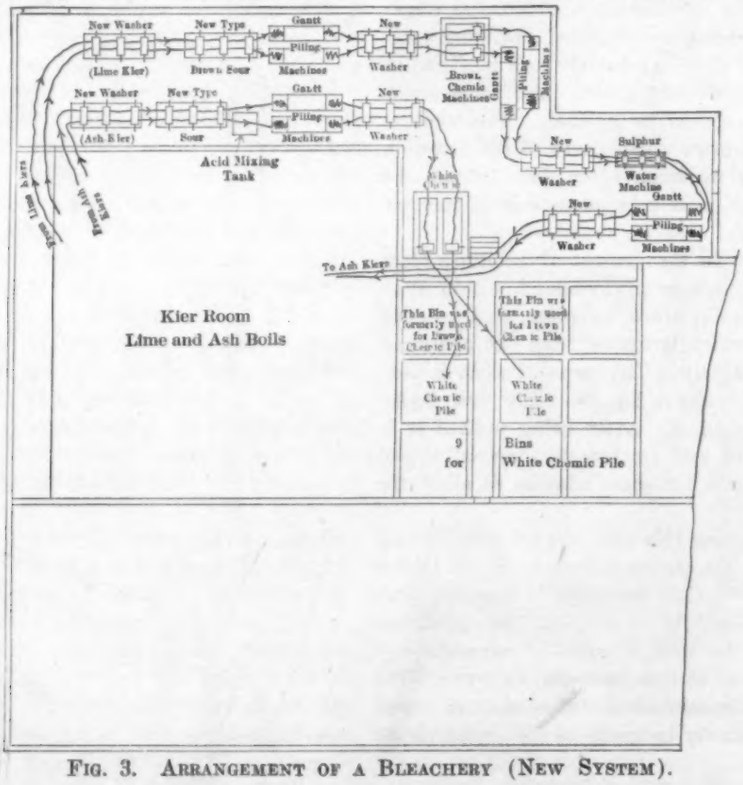


FIG. 3. ARRANGEMENT OF A BLEACHERY (NEW SYSTEM).

these troubles does much, not only to smooth the operation of the works, but to assure the customer that he is getting back exactly the goods he sent. Moreover, the dirt and damage caused by the piling boys are eliminated.

The saving in always having clean goods in uniform condition is greater than the saving in wages of the boys, and the relief to the foreman of having a smaller number of bleach-house boys to manage makes it possible for him to devote his time to bleaching rather than to boys, with distinctly beneficial results to the bleaching. In addition to the advantages already mentioned, there is a marked saving in time, for the cloth remains subject to the action of each liquid only the time needed to produce the desired result.

Each piling machine takes the place of from three to four bins, and as it takes up less space than one bin, the saving in buildings is very considerable. In one case, when the washing, "souring" and "chemic" machines were rearranged in such a manner as to use a full equipment of piling machines to the best advantage, the saving in bleach-house space amounted to more than 40 per cent. Wherever the machines have once been installed it is obvious that they soon become indispensable. The fact that such an important operation can be taken care of in such a simple manner is the best evidence that the writer entered a field that has not been thoroughly investigated by the mechanical engineer. The field is still open, for plants are being built to-day to handle cloth exactly as it has been handled for 50 years. The builders of these plants have not yet discovered the function of the mechanical engineer, and are still putting their faith exclusively in bleachers.

Fig. 2 represents the course of cloth through a bleachery where the writer was told that the process had not been changed for 50 years. Fig. 3 shows the course of the cloth in the same bleachery after it had been equipped with piling machines, and other machines adapted to work economically with them. The new installation takes up less than 60 per cent. of the space of the old and is operated by 6 people against the 20 people formerly needed. The operations and their sequence are the same in the new as in the old lay-out, except for the installation of an additional "sour," which was thought desirable to remove the alkali of the second boil. The new lay-out is not a new method of bleaching, but simply a mechanical engineer's method of handling the old. There is hardly a bleachery in the country where the mechanical engineer cannot do similar work, and that without doing violence to the prejudices of the bleacher. The standardization of bleaching methods must come later, and will take time, for we have here the habits of at least half a century to combat.

Statistics furnished by 17 plants in South Carolina show that out of a consumption of 40,354 bales, 33,140 were long staple, which is grown in the Yazoo valley section of Mississippi. It is shown that out of the 40,354 bales consumed that only 1,300 bales were imported from Egypt and that only 354 bales were grown in South Carolina. A report recently received by the South Carolina Department of Agriculture from 10 other textile plants shows that out of a total consumption of 31,360 bales, 21,360 were of the long staple variety and that only 60 of these bales were produced in South Carolina, the remainder being brought from the Yazoo section and Alabama.

CHEMICALS USED IN THE TEXTILE INDUSTRY.

(*Reported exclusively for* COTTON.)

BY DR. FREDERICK DANNERTH.
Consulting Industrial Chemist.

LECTURE VII.

THE ORGANIC ACIDS.

The substances to be considered in our present lecture include all those acids which contain the element carbon. They were originally termed "organic" acids because the discoverers thought that they could only be obtained from plants or animals, that is, living organisms. Fifty years of chemical experimentation sufficed to show that this idea was not correct as many of these "organic" acids (and organic compounds in general) can be prepared in the laboratory. The old idea of "organic" compounds was disproved by Woehler in 1828. In that year he prepared urea (found in urine) from cyanic acid and ammonia.

In the woolen industry organic acids find application in the operations of mordanting, dyeing and printing. The mordanting of wool is at times carried out with bichromate of potash and sulphuric acid, but experience has shown that far better results are obtained by the use of the organic acids, as these reduce the bichromate almost completely to the chromium oxide. The acids which have been used for this purpose at various times are formic, lactic, acetic, tartaric, oxalic, and of these five, the first two have given excellent results. In the dyeing of wool it is at times necessary to avoid the use of the strong sulphuric acid, and so the dyer resorts to the use of acetic or formic acids as fixing and leveling agents when applying methyl violet, the eosines, the rhodamines and many basic colors. In the printing of wool, the acids play the part of fixing agents and solvents—those in common use for this purpose have been mentioned under mordanting.

In the cotton industry we find tannic acid playing a very important part as a mordant for the basic dyes. This is made possible by the fact that tannic acid is absorbed by the cotton fiber. If cotton be immersed in a watery solution of tannic acid, the fiber will take up a certain amount of the tannic acid very slowly and evenly, the maximum absorption being attained at a temperature of 104 degrees Fahrenheit. In preparing cotton goods with tannic acid on a large scale it has been found preferable to use a "short" bath in order that as much tannin as possible may be attracted by the cotton. In the dyeing and printing operations, use is made of tartaric, lactic, formic and acetic acids as solvents for the dyestuffs.

In the mercerization of cotton, we find acetic and tartaric acids used as "scrooping" agents. The "softening" of water or "correction" of water as it is sometimes called, is frequently resorted to as a substitute for the systematic purification of water. The hardness of water is due in part to the presence of bicarbonates of lime and magnesia, and these may be rendered harmless by the addition of acetic or formic acid, which convert the bicarbonates into harmless acetates or formates.

PREPARATION AND PROPERTIES OF THE ACIDS.

FORMIC ACID may be prepared on a large scale by the action of glycerol ("glycerin") on oxalic acid. It is the

first member of the series of organic acids, designated by chemists as the "fatty acids;" acetic acid is the second member, and stearic acid is the 18th member of this series. Formic acid occurs in commerce as a slightly yellowish liquid containing from 80 to 95 per cent. of actual acid. When applied to the skin it produces painful blisters. It is one of the most valuable reducing agents known, and is therefore used in the mordanting of wool with bichromate of potash. It is further used in applying the neutral and resorcin dyes to wool, in applying the silk "scroop" to cotton, for brightening silk, and as an antiseptic agent in the preparation of starchy finishing mixtures. The pure acid boils at 212 degrees Fahrenheit, and is therefore more volatile than acetic acid.

ACETIC ACID may be prepared by fermentation of the juice of grapes or apples, a process which yields wine vinegar or cider vinegar. It may also be prepared in a pure form by the oxidation of dilute alcohol but a large part of the commercial article is the so-called wood vinegar or pyro-ligneous acid. This third variety is obtained when wood is subjected to dry distillation. The acetic acid present in the distillate is neutralized with lime and then forms the crude acetate of lime found in commerce. This latter product may be distilled with concentrated hydrochloric acid and finally purified by distilling it over potassium bichromate. Pyro-ligenous acid ("heated-wood acid") contains many substances in addition to acetic acid, among them being formic, propionic and butyric acids, wood alcohol, fusel oil and acetone.

Acetic acid finds extensive application in the dyehouse as well as in the printing room as a fixing and leveling agent and as a solvent, also for the brightening of silk, the scrooping of mercerized cotton, and the correction of hard waters. The "wood" acid is further used in the preparation of pyro-lignite of iron that valuable mordant for black silks. Absolutely pure acetic acid is crystalline and melts at 62 degrees Fahrenheit, so that it appears as a liquid in the summer time. One peculiarity of this acid is that a solution of 78 per cent. strength has the greatest density, (1.0748). From this point up to a concentration of 100 per cent. the density sinks to 1.0553, and likewise from 100 per cent. point to the 41 per cent. point the density sinks to 1.0553. Thus we see that the density 1.0553 may indicate either one of two widely different concentrations. In order to determine which acid we have before us it is therefore necessary to add some water to the sample. If the specific gravity (density) increases, the acid is stronger than 78 per cent. but if it decreases the original acid is weaker than 78 per cent.

STEARIC ACID differs materially from the two foregoing acids in that it is a solid at ordinary temperatures and is insoluble in water. When fats are saponified with concentrated sulphuric acid a mixture of dark colored fatty acids is obtained, and this is purified by distillation with superheated steam. The product is of a buttery consistency as it contains the liquid oleic acid in addition to the solid palmitic and stearic acid. The former is separated from the raw product by means of a fiber press, and the pure stearic acid prepared from magnesium stearate which is insoluble in cold alcohol. The commercial product "stearin" is really a mixture of stearic and palmitic acids. Shea butter, obtained from the seeds of the Bassia tree in Africa, is a convenient laboratory source of stearic acid. The fatty acids obtained by its saponification consist of stearic and oleic acids which can be separated perfectly by pressing and recrystallization from hot alcohol. The chief textile application of stearic acid is in the furnishing room where it is used for applying a soft and glossy finish which is at the same time waterproof.

OLEIC ACID occurs in commerce as "red oil." It may be obtained by subjecting to hydraulic pressure the mixture of fatty acids produced by the saponification of tallow. The expressed liquid contains a considerable quantity of palmitic and stearic acids, which separate out upon keeping the "red oil" for some time at a low temperature. Commercial oleic acid is frequently but incorrectly called "olein." It may be obtained wholly free from color and odor by distillation in a current of steam, but the undistilled article usually possesses an odor characteristic of the animal fats. The most important use to which "red oil" is put is that of greasing wool preparatory to the spinning process. In this operation the red oil is particularly useful, as it can be readily removed by washing with weak alkaline water after the wool has been spun. Mineral oils and wool fat cannot be so easily removed, hence these substances are undesirable adulterants and should be detected if present.

LACTIC ACID is sold as a liquid varying in color from pale brown to almost black and varying in strength from 22 per cent. to 50 and 80 per cent The latter article has been recently put on the market by the Badische Co., New York City. Lactic acid may be prepared by the fermentation of glucose with the acid of the bacillus laevo-lactici, but as the bacillus is destroyed by the concentrated acid, chalk must be added from time to time. The calcium lactate obtained is treated with sulphuric acid in order to liberate the lactic acid. This product is finding increasing favor as a reducing agent in the chrome mordanting of wool as a substitute for formic and sulphuric acids. In many cases the sodium, potassium and ammonium salts (Lactamine made by the Avery Chemical Co.) are used in place of the free acid. As the term indicates, this acid is the cause of the sour taste of fermented milk, in fact several attempts have been made in recent years to work up skim milk for the lactic acid which can be prepared from it, but these experiments have not yet attained commercial importance.

TARTARIC ACID is obtained in the form of potassium acid tartrate as a by-product in the fermentation of wine. This substance is present in grapes in large quantities, and separates out soon after the fermentation of the alcohol. It then collects on the bottom of the tanks as "cremor tartari" (cream of tartar). The raw tartar or "Argols" is boiled with hydrochloric acid in order to obtain free tartaric acid; and finally milk of lime (calcium hydroxid) is added to form calcium tartrate. It is then well washed and decomposed with sulphuric acid, whereby gypsum separates, and tartaric acid goes into solution. This product has been used for imparting to mercerized cotton the "silk scroop" and for brightening genuine silk. It is used as a fixative in printing cotton, wool and silk in which cases it is valuable as it dextrinizes the starch to a certain extent, thereby rendering its removal from the fabric easier. Cream of tartar was for many years the most important assistant used in the mordanting of wool with bichromate of potash.

OXALIC ACID is obtained by fusing sawdust with potassium hydroxide. The fused molten mass which contains potassium oxalate is cooled and extracted with water; the extract is mixed with milk of lime and the calcium oxalate

thus formed is treated with sulphuric acid in order to liberate the oxalic acid. The crystallized acid of commerce is fairly pure and is used chiefly because of its reducing properties. It was at one time used for chrome mordanting of wool and for the stripping of wool. It is still used as a bleaching agent for jute and as a rust spot remover in which case the soluble oxalate of iron is formed. At this point I might add that this acid is in most cases capable of destroying ink and ink spots on textiles. Finally I would call your attention to the use of oxalic acid in connection with the permanganate bleach for vegetable fibers, as the color of the permanganate can be completely destroyed by a subsequent bath containing oxalic acid.

CITRIC ACID may be prepared from unripe lemons by adding milk of lime to the juice of the fruit. The tricalcium citrate formed is only slightly soluble in boiling water but is readily decomposed by sulphuric acid. This acid may also be prepared by the fermentation of glucose or of cane sugar with the bacillus "citromyces glaber." "Lemon juice" occurs in commerce as a viscous dark brown solution containing about 45 to 75 grams of actual citric acid per liter, or as a 25 to 30 per cent. solution. This substance is used in the printing of cotton and silk as an addition to discharge pastes.

TANNIC ACID is obtained from almost every part of various trees among which may be mentioned the leaves, stems, rind, fruit, wood and excrescences. Among the trees containing this substance are oak, sumac, catechu, quebracho and spruce, hemlock and chestnut. One of the most important sources is the gall-nut formed on the buds of oak trees by the female of the insect cynips. Tannic acid is known to the dyer as an extract of thick consistency or as a cream colored powder containing as much as 80 per cent. actual tannic acid. Good samples of commercial tannic acid dissolve to a clear solution in water or alcohol. Substances which may be present as adulterants and which are insoluble in these media are: starch, sugar, dextrin and mineral matter. Good tannic acid yields a very small ash, it is used for the fixation of certain basic dyes whereby tannates are formed on the fiber. This compound is then "fixed" by passing the goods through a bath of tartar emetic or some other antimony salt. It is interesting to note that the tannic acid lakes of the basic dyes appear much more brilliant on cotton than on wool. Basic dyes printed on wool without tannic acid are brighter but not so fast to washing.

Whenever shades other than black on any fiber are to be produced it is absolutely necessary to avoid the presence of iron, as tannic acid will in all cases yield an "ink" with salts of iron. These inks can, however, be destroyed by oxalic acid. One application of tannic acid which is now gradually becoming obsolete is in the production of Turkey red on cotton. Thus in the production of Turkey red "old style" the yarn is steeped in a decoction of sumac before mordanting, experience having taught the yarns thus treated are fast to chlorine. In the "mixed alizarine red method" one-half pound of tannic acid is added to the dyebath for each 100 pounds of yarn to be dyed. In conclusion I wish to call your attention to the fact that the tannic acids derived from the several sources mentioned above are not chemically identical in the absolute sense of the term, but they do show certain class reactions for which reason they have been placed in one group. All the tannic acids possess an "acid" character; they precipitate albumin, glue and alkaloids; they are soluble in alkalies; are converted into yellow to brown dyes by oxidizing agents; and all yield the characteristic "ink" reaction with soluble salts of iron.

FINISHING FOR SHIRTINGS.

The finishing of shirting cloths, in which are included Beatrice twills, stripes, checks and fancies of every description, is a simple operation, and, in most cases, easy to accomplish, particularly in the case of the best qualities. For instance, take a pure Beatrice twill, of 18 lb. quality. These and other equally fine qualities need not be wetted out at all, as they can generally be turned out with a perfect finish by slightly damping, then stretching on the belt stretcher, to about the width required, and followed by a run on a five-bowled calender with a good heat and heavy set. Stretch the goods a second time, then give a final run through the calender, three nips with a light set and moderate heat. The goods, if wide enough, are then ready for the making-up room. If the twill is at all flat, a final run on the belt stretcher will generally lift the twill, giving it the round bold appearance required by most merchants.

All white fancy shirtings such as stripes, oatmeal grounds, and checks, will usually not require more than one run through the five-bowled calender, lightly set on, with a final stretch on the belt stretcher, so that the stripes and fancy grounds will not be too flat.

Some mercerized Beatrice twills are very low in quality, and these require far more work and care to give the finish required. Merchants as a rule are very particular about the finish of these low quality cloths. The best way to deal with them is to give the goods plenty of damp, then let them stand for a few hours, and next give them a run on a five-bowled calender, using plenty of heat and weight to mill up the goods. They are then taken to the mangles, given a filling with ½ to 1 lb. of dextrine or gum to the gallon of water, and one or two gallons of oil to 50 gallons.

MERCERIZED SHIRTINGS.

Especial care must be taken with these cloths, as some mercerized goods, particularly whites and creams, after being treated with soluble oil, have a tendency to develop a rancid smell which is very strongly objected to on the market. The soluble oil is responsible for this; cheap oil is very frequently used, but since competition is so keen, the better way is to overcome the difficulty, rather than get a more costly oil.

If there is any good soap available, about 20 lbs. of this cut up and boiled to a jelly is used with the oil, in the proportion of about one gallon of soap to one gallon of oil; and this will almost always overcome the objectionable odor. Another way is to add 1 lb. of acetate of soda to about sixty gallons of every mixing made for the filling of the goods; this in nearly every case will prevent the goods from developing any objectionable smell.

It is always more economical to fill these goods on a mangle with a tentering machine attached. The goods can then be dried and stretched to little over the finished width required, which saves a lot of work in the final finishing off.

After filling, allow the goods to stand a few hours, then damp and give one run on a five-bowled calender of good set and heat. This generally gives the finish required.

In the low qualities Beatrice twills which are not mercerized, the same treatment will apply.

Practical Problems Discussed by Cotton's Readers.

Discussions of Mill Problems are Solicited for this Department.

POINTS ON CARDING.

BY P .B. P.

It is generally conceded that the fundamental principles of cotton manufacturing for the production of an evenly spun and smoothly woven piece of finished goods are to be found in the card room. One not thoroughly versed in the art may wonder why the card room is so important, for most of the machinery used now-a-days is modern and automatic as far as possible. But if the foundation for the making of a good yarn is not well laid in the first process the result will be poor yarn. I say that this vocation is an art—not to the common overseer that is sometimes found over the country to-day running rooms—but to the man who has ground cards, studied the art, mastered the situation and has finally been promoted after years of experience to the position of overseer.

In the first place the cotton is received from the gin in a compressed mass with its fibers twisted and tangled in every way possible, besides containing burs, motes, leaf, dirt and a great deal of other foreign matter that could be gathered out of a cotton field. All such impurities that the manufacturer buys for cotton must be eliminated with as little good stock as possible. In buying cotton, you nearly always get it from all parts of one State and some times two or three States. You will invariably find the staple to be of different body, and the length of the fiber does not run evenly. Therefore, the mixing process is of prime importance. If working different stapled cotton, care should be taken not to get a bale of different length in the mixing. After you have the cotton graded, then the best mixing is none too good.

In making a mixing, first find the number of bales required for a day's run; then open up at one time enough for two days' run, if possible. Shake well a portion from each bale onto the pile. A thin layer of waste should be spread over the pile at regular intervals; just enough to use the waste gradually. By allowing the cotton to stand over night gives the staple a chance to open up again into its originally fluffy state.

Careful hands should be selected for operating the pickers. Even when you have help that may be considered as first-class hands, it is well for the overseer to go into the picker room occasionally and weigh a few laps, and look over the weight record. Always set aside the laps for reworking which vary more than one-quarter of a pound from the standard. With well mixed cotton, properly fed into the hoppers and the eveners working well, little trouble will be experienced with the lap weights.

The feed plates on cards are usually set with from No. 10 to 17 gauges, depending upon the length of the staple and weight of the lap. The mote knives should be set sufficiently close to the licker-in to shave off the remaining loose notes, and just far enough away from the bite of feed roll to prevent too much fly from falling under the licker-in. The life of a card rests in its wire fillet, therefore, it should be taken good care of. Every time a bunch of waste or wad of anything goes into it, its efficiency is reduced, and sometimes it takes months of grinding to again get the wire in good condition.

In making the setting on a card it would be well to follow this rule: Set your doffer, licker-in, mote knives or in fact any setting a little close; then back off with your back jam nut. By so doing you have a guarantee against hooked or faced wire from the jarring loose and slipping of parts into the cylinders. After stripping the cylinder, the end of the sliver should always be broken down or allowed to run into a waste can for one or one-half minutes, so as to allow the cylinder to fill that your sliver may be the correct weight, as before stripping. When this is not done you usually find your sliver about 10 grains light.

It is important that the top rolls on the drawing frames should be looked after carefully, whether they be leather or metal. The leather rolls are liable to become fluted, or if a little cotton gets on the middle roll bearing, it will stop. The roll settings vary with the length of the staple and the weight of the sliver at the back of the drawings. A heavy sliver requires wider settings.

Passing to the roving frames, there should be just enough twist put in to keep the roving from stretching in the next process. The tension should also be looked after carefully. Have the ends fairly tight at the beginning of the run and when the bobbin is about one-third full each end should have gained a little slack.

KNITTING MACHINE TROUBLES AND REMEDIES.

BY E. C. C.

In the latch needle knitting machine, there are needles called crooked shanks. The open shank of the needle weakens the latter where it ought to be strong. This also refers both to dial and cylinder needles in a rib machine. The dial needle with the open shank catches dirt which packs it full, causing the needle to work hard and tip up at that point of the hook. This makes streaks in the fabric which look bad when the garments are finished. This is one of a knitters many troubles.

Another defect is made when the cylinder drops stitches. This occurs from many causes, as a knitter knows, but some do not know that they come from having the dial set too far away from the cylinder. This causes the thread guide to be too far away from the needles. The dial should be kept as near to the cylinder as it can be run without loading up the needles. Some knitters always raise the dial for every little difficulty, and if they are making shaped underwear and the garment is short or long; up or down goes the dial. By keeping the dial down you get a better looking fabric; but some knitters will want to know what to do if the garment is too heavy or too high. In either case use your cylinder stitch cams; that is what they are for.

Another thing that will cause the cylinder to drop stitches is the guide with the hole too far up, which carries the yarn over the needle. Such a difficulty was recently encountered by the writer, and it took him some time to discover the trouble. The holes in the thread guide should not be too large. The size, of course, depends on

the number of yarn you are using. This same trouble may be caused by setting the guides too far away from the needles. There are many knitters who do this. It not only causes the cylinder to drop stitches, but it bends the latches on the cylinder needles when the cloth leaves the needles, and if you are running bad yarn it makes a good deal of trouble for everybody concerned, from the operator on the knitting machine on down through the cutting room, mending, inspectors, and folders.

This has been my experience, and I have set guides every way that they can be set and still run. Set them as near as you can to the needles and watch the results, if they are too close you can tell in a short time.

THE RELATIONSHIP OF THE PLANTER AND SPINNER.

BY R. A. M.

In discussing this subject, I shall suggest the need of a closer relation, and the results of a closer relation between the planter and the spinner. The establishment and maintainance of desired conditions constitutes its work. At present it is an undisputed fact that the relationship now existing is capable of improvement to say the least. The erroneous idea has crept into both the minds of some planters and spinners that each is the other's enemy. Such an idea has no real basis of fact and where both have clearly considered the matter, they are in a better position to unite in an effort to dislodge their mutual enemy, the speculator.

Speculation is the plague of the cotton industry. A closer relationship between the grower and manufacturer would dispense with the middleman, thereby creating a stability of price, a condition much to be desired. Planters should take an interest in their trade organizations. The Farmers' Co-Operative and Educational Union now in vogue in many parts of the country is a worthy institution. Spinners also should maintain organizations for out of such associations much good comes, and by the concerted action of many with the same interest to foster a great force is wielded.

Besides the regular meetings of the farmers' and the spinners' organizations separately, the two interests should convene at certain periods and discuss in open council all matters of mutual concern. At such meetings such subjects as the cotton cultivation, picking, ginning, baling and marketing of the commodity could be clearly presented to the farmers and manufacturers. Also matters such as the condition and size of the crop, together with the price could be discussed. The yarn and cloth markets, cotton contracts and manufacturing conditions could also be discussed in detail. These are only a few of the many subjects which seem to evidence their need of mutual consideration. Others are the selection of seed for the best possible results; the cotton bale compress, warehousing, trading, etc.

The social side of the organization cannot be neglected, for the acquaintances and friendships formed under such conditions are of great material benefit, as well as a source of enjoyment. The result of such a relationship is inestimable. Its influence will continue to permeate the system until, when grown in size and strength, the bond of close relations uniting the planter and spinner will suppress their enemies and place cotton where it rightly deserves to be.

EXPERT WORK IN THE CARD ROOM.

BY W. P. H.

The subject of speeds on the lapper is a very important one. All beaters with not more than two blades and which are not more than 14 inches in diameter, should have a speed of 1500 revolutions or less per minute. All three-blade beaters should average from 1000 to 1250 revolutions per minute, according to the class of work, length of staple, etc. Some years ago I accepted the superintendency of a smoothly running mill. After taking charge, I watched things for one week, taking notes of every defect in the machinery. I also found that none of the spinners could keep up satisfactorily more than four or five sides of spinning. The number of yarn was 30s. I also noticed that the breaking strength of 120 yards was from 50 to 56 on 1 1/8 to 1 3/16 inch staple cotton. By figuring the speed through the mill from the fly wheel on the engine to the lappers, I found that the three-blade beaters were making 1650 revolutions per minute. The finishers with Kirschner beaters and intermediates with two blades were making 1950 and 2000 revolutions respectively.

I changed the speed of the three-blade beaters to 1150 revolutions and the two-blade and Kirschner beaters to 1450 on the intermediate and finisher lappers. Without making other changes, the breaking strength was increased to from 70 to 75 and spinners could run six and eight sides with more ease than they previously had run four and six. After setting the drawing rolls, over-hauling the fly frames, and setting spindles and rings, the spinners ran from eight to ten sides. The price of the yarn was also advanced by the manager, and in six months it sold for two cents more than the market quotations. I mention this merely to substantiate my statement.

The mill whose foreman looks after such things will be a success and the help will be plentiful at all times and in all departments. But where little things are neglected and the foreman is negligent concerning a perfect system, the help is generally scarce and the product of the mill is imperfect.

After the laps leave the picker room, the operatives need to be constantly cautioned in regard to handling them, otherwise they will tear off a yard or more as they put them onto the card, and quite often take off a small roll before the lap runs from the stick. The amount of waste made is one of the principal things to watch from the time the cotton enters the lapper until it is woven into the the fabric. There is more opportunity in the card room to make excessive waste than in any other department of the mill.

Setting the card depends entirely on its foundation and the length of cotton to be worked. The majority of mills throughout the country are equipped with revolving flat cards. We shall explain the settings of these first. The cleaner the cotton is before entering the card, the better the class of work will be. We might also add that the more uniform in length the staple is, the easier the sliver is to work. Where the card has a perfect foundation and is without any vibration, it performs its duty most satisfactorily. Set the mote knives with a No. 10 gauge; the licker-in to cylinder and feed plate to licker-in with a No. 7 gauge. These settings are for 7/8 to one inch staple. For 1 3/16 to 1 1/4 inch staple, set the feed plate to the licker-in with a No. 10 or 12 gauge, and to the cylinder

with a No. 7. Set the flats at the back of the card at the first stand with a No. 12 gauge; at the second stand use a No. 11 gauge, and at the third stand a No. 10; at the fourth stand use a No. 9, and at the fifth or the one nearest the doffer use a No. 7 gauge. Set the doffer to the cylinder with a No. 7 gauge. Set the comb with a No. 10 gauge and the screen at the back with a No. 22; at the center with a No. 29, and at the front with a No. 38. This will take out quite a lot of short staple, but will add to the strength of the yarn. Set the front knife plate with a No. 10, and set the breast plate not closer than .012. Increase the space until the card produces the required amount of strips. See that all cards are set at the same gauges, and that they throw out the same amount of flyings and strip, otherwise there will be a variation in the yarn.

If the foundation of the card vibrates, the setting cannot be so close, and any defects in the setting will be seen in the web as it comes from the card. If the doffer is not set close enough to the cylinder, the cotton will be carried around the cylinder and cut into many little nips. They are carried forward in the sliver and make weak places, also rough and imperfect yarn.

Many card grinders set all the flats to one gauge, using a No. 9 or 10, and while they get a fairly good grade of work, the setting is not theoretically correct. The fibers entering the flats on side nearest the licker-in are very much crossed and tangled, but as they are carried around to the front flats they become more parallel and regular. The front flats should be set closer to get the best results.

For very fine, even thread, it is necessary for the fibers to pass through a comber, where the short, weak fibers and all foreign matter are taken out. It is the opinion of the writer that in the near future, weavers will require a stronger and more evenly spun thread, which will necessitate combing all yarn finer than 20s. I make this statement because the sentiment of the purchasing public is for finer goods. They are willing to pay for it, and the manufacturer who does not cater to the demand of the consumer will soon see his mistake.

Where fibers vary considerably, such as wool, waste, hair and jute, the roller card has held its place, and waste cannot be successfully run on any other card. I have reference to low grades, sweeps, motes, flyings, bale pickings, etc. There are two systems, namely, the coiler and the condenser. Some mills prefer the double automatic waste card, as all waste must be double carded. The coarser numbers under 5s use the automatic feed attached to the card. The slivers are put through a doubler and wound into a lap which is put on the finisher card, which has rings on the doffer to separate the web into four to six ends making slivers. All the low grades of waste must be soaped before entering the cards. These slivers are taken direct to the slubber and are reeled from the bobbins.

The condenser system differs from that of the coiler, as the sliver comes from the card it is divided into small slivers by means of a ring on the doffer. These are condensed and wound into small laps about the size of a 9 x 4½ bobbin. These are set in the creels of mules or ring frames with wide gauge and large rings and spun into thread. There is a wide field for waste manufacture on account of the low price all kinds of waste and the limited number of mills on this class of work.

Cotton blankets have displaced woolen blankets in many important markets of the world.

WHAT A TEXTILE JOURNAL SHOULD BE.

BY J. C. E.

A textile journal should possess as wide a source of information as possible. Besides having numerous correspondents in all parts of its territory who are reimbursed according to the amount and class of work sent in, a paper should select a capable man, and one who is in active textile business and who keeps in touch with all the latest improvements and is able and willing to suggest a remedy for any difficulty that may arise in a textile plant, so that he may give information to any one applying for same, either through the paper he represents or by personal correspondence.

Many a young man in taking charge of a mill or department is confronted with difficulties which will not await the arrival of his weekly or monthly paper, and if his paper employs a man to help him out of such places, and who can give him immediate relief, he does not feel embarrassed to sit down and write as a friend to a friend asking the information desired. One could often save his position or at least many dollars to his employer, and always feel grateful to the journal for being a "friend in need." The question and answer should come out in the current issue and benefit all of its readers.

An editor should be a man of wide knowledge, not only in the textile world, but also in the printing business, so as to be able to give his subscribers the benefit of an economically managed press and also be able to select that class of reading which will please his readers and not fill his columns with dry, meaningless material that is worth only the time of the idler. He should give us something interesting and to the point, something that will make us better employers, better employees and more skillful workmen, so that we might attain that for which all worthy and ambitious men are striving—success.

A textile journal should conduct an employment bureau, but should not endeavor to recommend a man unless the management is thoroughly acquainted with the applicant. It should merely be a means of bringing employer and employee together. A paper should be liberal and strive to hold the old subscribers; a good motto here would be: "Please the old subscribers and they will bring you new ones." The press is one of the greatest, if not the greatest governing power we have, and a textile journal should vigorously defend any attack, whether commercial or moral, made upon the textile trade, and be ever ready to defend the weak where a square deal is not being meted out.

British exports for April show that 16,000,000 pounds of yarn were exported, or substantially the same amount as in March. For the season ending with April the total was 63,000,000 pounds. Cloth exports for April were 468,000,000 yards, compared with 476,000,000 yards in March. For the season, including April, a total of 1,905,190,500 yards of cloth were exported, compared with 1,790,822,100 yards last year for a like period.

The manufacturers of South Carolina are anxious for the farmers of the State to plant long staple cotton in South Carolina for home consumption, which will mean a great saving both to the producer and manufacturer.

NEW MACHINERY AND TRADE NOTES

THE TRANSPORTATION PROBLEM OF NEW YORK.

Much has been said and written about New York City as a favored port; and its commercial greatness has become synonymous with the greatness of the United States. Yet, the city's merchants are not without their cares, and, owing to the inter-relations between the metropolis and the producing centers which pour their bounty into this great market, there are times and cases when the city's troubles become the concern of the whole country.

One of these cares is the freight transportation problem. Miles of congested streets separate the best known and oldest wholesale districts from the piers, the railroad depots, warehouses and factory locations; and miles of congested streets separate these from each other. The waste in cost of labor represented in trucking, in loss of time, in breakage in city transit, runs into the millions each year. "I am going to move to where things are better," said the New York representative of one of the largest mills in the South. "I am tired of this sort of thing. A large shipment came in by steamer to-day. My trucks are just now busy hauling it from the pier to the warehouses, a distance of three miles. Pretty soon, I'll want some of the goods, and then I'll have to truck it piecemeal from the warehouses to my place of business—another two miles—and from here it will go out to our customers all over town—more trucking. I am going to quit the wholesale district and move to South Brooklyn."

South Brooklyn! That is the watchword to-day among the wholesalers, the jobbers and the manufacturers of New York. Once upon a time, before the South Brooklyn section of the city was what it is to-day, they did not know where to turn, and so they thought of all kinds of plans to relieve the freight congestion and to shorten either in time or length of haul the distances that separate the various shipping agencies. Municipal aid was thought of; a project to duplicate here the Chicago freight subway system cropped up. Some one proposed a freight elevated railway, and even the belt line idea was revived, only to be dropped, like all the rest. In the meantime, private capital had taken the matter in hand, and at tremendous cost but with an absolute assurance of success, created a new commercial and industrial center which, on one tract, combines all the agencies that go to make up the shipping business. It is located in South Brooklyn and is known, far and wide, as the Bush Terminal.

Quick to take advantage of every promising innovation, dry goods firms and wholesale garment manufacturers are now removing their plants to this location. They know that the determination to correct the evils which beset them in the older sections, prompted President Irving T. Bush, of the Bush Terminal Co., to develop his immense real estate holdings into the plant which now fills the space along the Government channel, between Thirty-ninth and Fifty-second streets. It is practically the only section in the world which combines within its limits every conceivable shipping facility, both for outward and inward bound freight which merchants can possibly want to take advantage of. More than that, through various means of systematized application, every one of these shipping facilities is brought actually to the very doors of the shipper.

FIG. 2. THE GREAT UNION RAILROAD TERMINAL OF THE BUSH TERMINAL CO., NEW YORK CITY.

To-day, over a hundred firms, some of national reputation and international scope, are among the tenants of the Bush plant. Among the prominent representatives of the drygoods and clothing lines are: Faulkner, Page & Co.; Deering, Milliken & Co.; Converse, Stanton & Co.; Detmer Woolen Co.; Pecrless Pattern Co.; Amdur Brothers; Excello Shirt Co.; W. Aronstein & Bros.; and others.

The saving in expenses by occupants of the Bush Terminal is best shown by actual figures which have been secured from the books of one of the concerns located in the Terminal. Edward D. Page, of Faulkner, Page & Co., when requested to state whether the advantages he now enjoys justify the trouble and expense of his removal from the older portion of the city to the newer, sent a note to Mr. Bush, in which he said:

"Below you will find a comparison of our expenses for storage based on the actual figures of the year 1907 and the actual status to-day. The insurance given in the

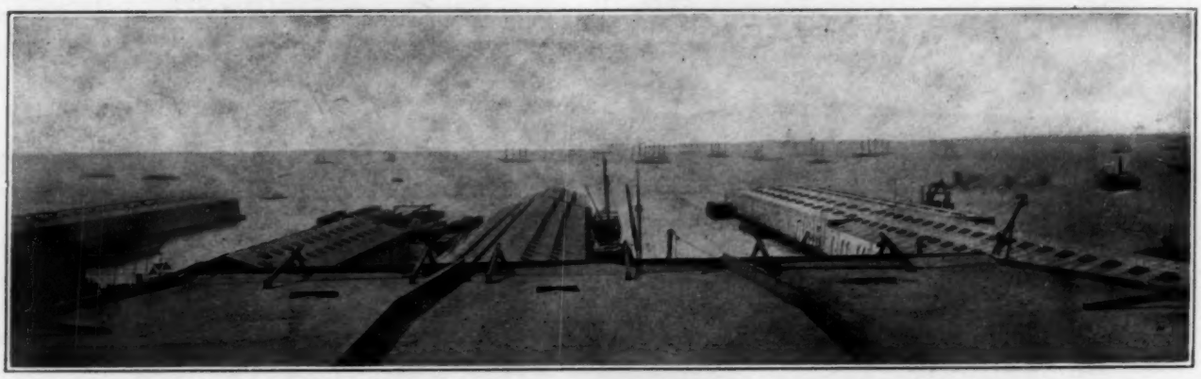


FIG 1. BIRD'S EYE VIEW OF THE PIERS OF THE BUSH TERMINAL CO., NEW YORK CITY.

LOFT IN BUSH TERMINAL BUILDING, NEW YORK CITY, OCCUPIED BY FAULKNER, PAGE & CO.

1910 column was the actual disbursement for the year 1909 as is also the amount of saving on cartage which, however, has been saved to our consignors rather than to ourselves.

	1907	1910	Saving
Labor	$ 9,750	$ 4,732	$ 5,018
Rent	13,275	9,780	3,495
Insurance	8,912	3,252	5,660
Cartage	668		
Total	$32,605	$17,764	$14,841
Less extra expenses viz.:			
Private telephone line		$498	
Messenger service		$346	
Total			$844
Net saving annually			$13,997

A net saving of $13,997 in one year is a respectable item even on the books of the largest firm. How was it brought about? A bird's eye view of the Bush Terminal shown in the illustration Fig. 1 will serve as good as any other explanation. The waterfront along the Government channel is lined with great piers designed to offer wharf

SCENE AT ONE OF THE PIERS OF THE BUSH TERMINAL CO., NEW YORK CITY.

accommodation to the freight steamers which bring from and carry to all parts of the world the goods which form the basis of our commerce. Back of these piers is an extensive series of fire-proof warehouses, where merchandise, not required for immediate use can be held. Behind these warehouses is located a great union railroad terminal, shown in Fig. 2, where cars for every road reaching the City of New York await the freight from steamship or railroad. Here the land carriers meet the ships carrying the over-the-sea cargoes, and in order to be sure of a direct connection between the two, the company has established a private terminal railway, the tracks of which reach every corner of the plant.

A list of the steamship lines and railroads reaching this center may be of interest. The former includes Norton Line, to and from River Plata; Bucknell S. S. Lines, Limited; American & Indian Line, to and from East India and Ceylon; American & Australian S. S. Line to South and East Africa ports; U. S. & China-Japan S. S. Line, to and from China, Japan and the Philippine Islands; The Hansa Line, to and from the East Indies; The Royal Dutch West Indian Mail Service, to and from the West Indies; The Sloman Line, to and from Rio de Janeiro, Santos, and other Brazilian ports; The Prince Line, Ltd., to Brazil, River Plata, South Africa, etc.; Lloyd Italiano S. S. Co., to Mediterranean ports; American & Oriental Line, to China-Japan Straits and the Philippines; Austro-American S. S. Co., Ltd., of Trieste; Lloyd Brazileiro (Brazilian S. S. Line); American-Hawaiian S. S. Co., freight service between New York, Pacific Coast ports and

FIG. 3. REINFORCED CONCRETE BUILDINGS OF THE BUSH TERMINAL CO., NEW YORK CITY.

Hawaii; American-Asiatic S. S. Co., to and from Japan; Standard Oil Co., from Japan, China, Straits Settlements and the Philippines.

The railroads and their affiliated companies reaching the Bush Terminal are: the Central R. R. of N. J.; Delaware, Lackawanna & Western R. R.; Erie R. R.; Lehigh Valley R. R.; New York Central & Hudson River R. R. and connections; West Shore R. R.; N. Y., Ontario & Western R. R., and the Pennsylvania R. R.

But this is not all. Back again of the railroad terminal are located the great factory and loft buildings of steel and concrete, shown in Fig. 3, where the merchants can fabricate and distribute the crude or manufactured products at their door brought to them by the steamship and railroads. Beneath these spacious buildings and piers is a network of pipes and wires controlling a double system of fresh and salt water fire sprinklers, steam for manufacturing and heating, and electricity for power and light.

These buildings are the key of the entire plant, and incidentally furnish the solution to the problems referred to above, which the woolen and cotton trades in New York City are confronted with. They are each about 700x75 feet, six stories high, and contain on an average 375,000 square feet each. The various floors are capable of subdivision into minimum spaces of 5,000 square feet. It is very interesting to watch the method by which tenants in these lofts take advantage of the opportunities offered them. The out-of-town concern shipping the goods consigns them to John Smith, Bush Terminal, Brooklyn, N. Y. The car rolls up alongside a long, wide and unobstructed platform, one extending out from each of the loft buildings between which the tracks extend. Here are the goods at the tenant's very door, and he has not paid a cent in excess of the regular freight rate for service, the Bush Terminal being a terminal of the railroad which brought the goods.

For outgoing merchandise the advantage is the same. Mr. Smith wishes to make a shipment to another city, or several shipments to various and widely separated points. Immediately on beginning to pack up the shipment, he notifies the Bush Terminal Co., his landlords. A car is waiting at the platform below by the time the goods are ready to go down the elevator. The moment the goods are taken from Mr. Smith's floor on the elevator, his responsibility for them ceases. The Bush Terminal Co. is responsible for them until they are stored away in the car waiting below, and then the railroad assumes the responsibility. A powerful electric engine yanks the car out from between the towering loft buildings, across the freight yards, and the shipment is under way. And if it is a water shipment that is to come or go, the Bush Terminal Railway establishes the connection between the pier and the loft.

At the present time, about 96,000 tons a month are shipped through the agency of the Bush Terminal Co. Before the loft building development was started, the average was about 15,000 tons monthly. Approximately 12,000 of the 96,000 tons of the present day come and go by water.

Across Third Ave., at the back of the plant, is a series of model tenements erected by Mr. Bush, for the purpose of concentrating and systematizing the labor market of the section, on the one hand, and, on the other, offering the workers in the loft buildings the advantages of modern and sanitary homes of a kind which it is absolutely impossible to find in other wholesale districts of the city.

NEW PUBLICATIONS.

MODERN BLEACHING AGENTS AND DETERGENTS, by Professor Max Bottler, has been recently translated from the German by Charles Salter. The work is illustrated and contains 160 pages, dividing the subject on modern bleaching agents and detergents into two divisions. In the first division a review of the old and more recent bleaching agents is followed by a detailed account of those of modern origin. Considerable space is devoted to a description of the properties of the various new bleaching agents, and proper consideration has been given to the discussion of chemical processes. Electrical bleaching is discussed very fully, giving an account of the present state of the industry.

The second division deals with the behavior of the various textile materials under the action of chemicals, which thus affords a good idea of the methods by which detergents (cleansers) should be applied. A description of the chief modern detergents is then given, and the various methods of application for eliminating stains are described. In addition to the detergents properly so called, modern laundry preparations are detailed. Copies of this book may be obtained through COTTON. Price, $2.00.

THE FINISHING OF TEXTILE FABRICS (Woolen, Worsted, Union and Other Cloths), by Robert Beaumont, M. Sc. M. I., Mech. E., Professor of Textile Industries, University of Leeds, is a new work consisting of 257 pages dealing with this important subject. The work takes up an elementary description of woolen, worsted, and union fabrics, the processes of finishing and their effects, the process of scouring, describing scouring machines, the theory of felting, fulling, and milling machinery, the theory of raising, raising machinery and the raising process, cutting, cropping and shearing, lustering process and machinery and method of finishing. There are 151 illustrations of fibers, yarns and fabrics, and also sectional and other drawings of finishing machinery. The work has been carefully prepared and the name of the author guarantees its value. The book may be obtained through the COTTON PUBLISHING CO. Price, $4.00.

THE YEAR BOOK FOR COLORISTS AND DYERS, Volume 12, by H. A. Metz, has just been issued by H. A. Metz & Co., New York City. This 12th volume in the series contains the novelties of the year in the dyeing industry in a condensed form. Of special interest is the increased number and the greatly improved qualities of the so-called "vat dyestuffs" which now appear to be the means for furnishing colors of hitherto unapproachable fastness. The first part of the volume contains valuable reference tables followed by a short treatise on the history of colors. The patents for the year 1909 then claim attention, followed by the notes on processes, new colors, etc. The work that is being accomplished by the textile schools of the country is then discussed very ably, and the work concludes with a list of dyestuffs, makers and methods and miscellaneous notes. The book will be sent complimentary by H. A. Metz & Co., New York City, to dyers who make application.

S. A. FELTON & SON CO., Manchester, N. H., manufacturers of the well known "Sofco" mill brushes, believe that an improvement in business is certain to follow present conditions.

The growth of their brush business, established in 1847, and the making of the name of "Felton" recognized as a

standard in brush quality, are the results of a determination to make brushes in the best possible manner. They are continually adopting improvements and improved methods of manufacture and in a general way are keeping ahead of the business.

MERCERIZED YARNS.

Although John Mercer gave his name to a process for adding luster to cotton yarns so far back as 1850, yet there was little, if any, adaptation of the process until 1896, when the Arlington Mills began the manufacture of mercerized yarns on a scale sufficiently large to supply trade demands. Now after fifteen years of experience they are perhaps the largest manufacturers of mercerized yarns in the world.

While it is possible to mercerize low grade yarns, the policy of the Arlington Mills from the beginning has been to produce only the highest quality, and to that end they use only long stapled Sea Island and Egyptian cottons. These long stapled cottons produce yarns not only of a superior luster and finish, but also of the greatest strength. Of necessity the highest grades of goods containing mercerized yarns are and will continue to be made from yarns of this character.

The Arlington Mills are entitled to the credit of permitting the general use of the mercerizing process in this country instead of allowing it to be controlled by a monopoly sought under patents declared invalid after long litigation, and those manufacturers who have used Arlington mercerized yarns for some years will remember with gratitude how they were protected during this litigation from threats made against them as users of such yarns.

The process of mercerizing is intricate, and after the high grade combed yarn is delivered from the spinning room elaborate machinery and the greatest skill are required in order that the product may be always of Arlington character and reliability. Four qualities are manufactured, all being adapted to the manufacture of the most highly finished goods on the market.

Single mercerized yarns are delivered on cones.
Ply yarns are put up in warps, skeins or on cones.
Mercerized ply yarns may be treated as follows:
Mercerized and bleached.
Gassed and mercerized.
Gassed, mercerized and bleached.
Mercerized and colored.
Gassed mercerized and colored.

These are delivered in warps, skeins or on cones. All of the processes of manufacturing these beautiful yarns are carried out at the Arlington Mills, Lawrence, Mass., and the entire product is sold by William Whitman & Co., Boston.

Dixon Crucible Meeting.

At the annual meeting of the stockholders of the Joseph Dixon Crucible Co., the old board consisting of Geo. T. Smith, William Murray, William H. Corbin, Edward L. Young, Geo. E. Long, William H. Bumsted and Harry Dailey, were unanimously re-elected. The board of directors re-elected the former officers, namely, Geo. T. Smith, Pres.; William H. Corbin, Vice-Pres.; Geo. E. Long, Treas.; Harry Dailey, Sec.; J. H. Schermerhorn, Asst. Treas. and Asst. Sec. William H. Corbin was also re-elected as counsel.

The stockholders present expressed themselves as thoroughly satisfied with the management of the company by its officers. Of the total number, 10,000 shares, there were represented 8,856 shares.

LOWINSON'S TRIPLEX THREAD COUNTING MICROMETER.

This instrument, which is meeting with such success among textile manufacturers, commission houses, jobbers, etc., embodies in its construction all of the requirements for accurately counting the number of threads per inch in cloth with the greatest ease and speed. It is fitted with a fine magnifying glass that can be readily focused to suit the vision of the operator. One of the most important features of the instrument is its rigidity when placed on the cloth for counting the threads, no points being required to hold it from moving.

The U. S. government has adopted it for the Board of U. S. general appraisers and for the appraisers of the ports of New York, Chicago, New Orleans and Providence, as well as for the Department of Agriculture, Bureau of Chemistry, Washington, D. C., and the Quartermaster's Department, Philadelphia, Pa. The Lonsdale Co., one of the largest manufacturers of cotton goods in this country, is now using this instrument in most of its weaving and finishing plants. This instrument is also in use by most of the mills of Fall River, Providence, New Bedford and other New England manufacturing towns.

Every manufacturer of textiles will be interested in this device, as it is generally recognized as the standard counting glass in this country. Chas. Lowinson, 395 Broadway, New York City, who is the sole agent, has met with such success in this country that he has patented the triplex micrometer all over the world.

THE LOWRY "ROUND BALE" PATENTS.

An item of considerable interest to cotton manufacturers and ginners is the proposed sale of the patents for the Lowry round bale, bids for which will be opened on July 15th by the Planters Compress Co., 201 Devonshire St., Boston, Mass. This will undoubtedly afford an unusual opportunity to procure foundation patents, which will in all probability be essential to any one who in the future plans to develop a machine for compressing cotton at the gin. It does not seem unreasonable to state that compression of cotton at the gin must come in a comparatively near future, and that the present expensive and wasteful method of handling cotton between the gin and the spinners must be eliminated.

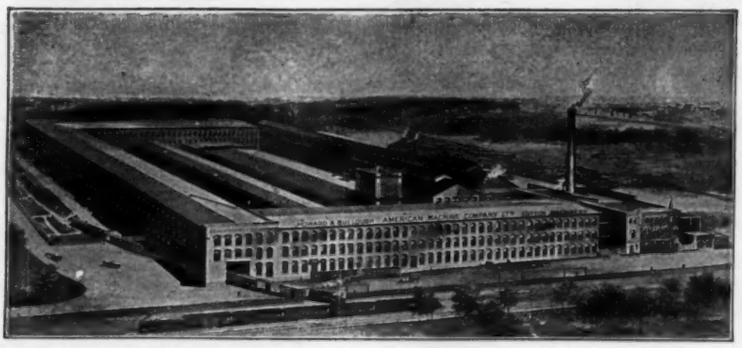
GEORGE A. LEIGHTON, of the Leighton Machine Co., Manchester, N. H., has returned from his winter residence in Los Angeles, Cal., earlier than usual this season, for the purpose of superintending the erection of a new factory for the joint use of the Leighton Machine Co. and the Currier Needle Co. A well located site of three acres has been acquired in East Manchester and plans have been made by Wm. Butterfield, a Manchester architect, for a brick building of improved construction, 240x40 ft. wide with two floors. This will double the present capacity of their fac-

C. E. RILEY, Treas.
Boston Office
65 Franklin St.

HOWARD & BULLOUGH
American Machine Company, Ltd.
PAWTUCKET, R. I.

Southern Offices
814-816 Empire Bldg.,
Atlanta, Ga.

COTTON MACHINERY



ARE YOU INTERESTED TO KNOW WHAT IS THE BEST?

SEND FOR OUR DESCRIPTIVE CIRCULARS WITH LISTS OF USERS.

HOPPER BALE OPENERS
FEEDERS
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tory, which for some months has been so crowded that orders could not be filled as promptly as desired. Steam will be used to furnish power, and the company hopes to complete and occupy the building by October.

ACME STEEL GOODS CO., Chicago, Ill., have removed their Atlanta, Ga., offices from the Empire Building to larger quarters at 58-64 West Alabama Street. The increased space thus provided enables them to double their already large stock of goods and insures promptness and economy in delivery to their trade. Their chief products are baling ties and buckles, box strapping and fasteners of all kinds, strap and "T" hinges, etc. J. R. Regnas is Southern manager.

THE PSARSKI DYEING MACHINE CO., Cleveland, O., gives the following directions for bleaching with the Psarski Dyeing Machine, in lots of 500 pounds of cotton yarn in skeins:

Boil three-quarters of an hour with 2 per cent. caustic soda and then rinse in warm water for 45 minutes. Fill the machine with water and add 19 gallons chloride of lime solution at 12 degrees Twaddell; then run the machine 30 minutes. Rinse the stock in warm water for 20 minutes and in cold water for 5 minutes. Without touching or removing the material from the machine, add 7½ lbs. sulphuric acid and circulate it 20 minutes, and then rinse in cold water for 20 minutes. The total time required is 3 hours and 5 minutes. It should be understood that all of these different operations are performed without handling the material from the time it is put in the machine until the process is completed. If required, the yarn may be soaped, tinted or dyed colors that require bleached yarns.

E. D. JEFFERSON, 131 State St., Boston, Mass., builder of the "Jefferson" Circulating Kiers, has issued a pamphlet entitled "Economy Tests and Operation of Jefferson Boiling Kiers" in which some very interesting figures are given relative to tests made at the Silver Spring Division of the United States Finishing Co., Providence, R. I., the Arnold Print Works, North Adams, Mass., and the Lowell Bleachery, Lowell, Mass. Exact reproductions of the test sheets are shown, and according to the figures given there is a very large saving effected by the use of the Jefferson kier. A copy of the pamphlet may be had by addressing the Boston office.

FARBENFABRIKEN OF ELBERFELD CO., New York City, has recently issued some very interesting color sheets describing new dyes suitable for cotton and wool. Algole Grey B paste is used for dyeing fast shades on cotton, and is distinguished by its excellent fastness to chlorine, washing, boiling, cross-dyeing and light. It is dyed cold, and combines very well with Algole Yellow 3G, R, Algole Orange R, Algole Red B, 5G and Algole Bordeaux 3B. The dyes suitable for wool are as follows: Chromoxane Violet R and Violet B which are noteworthy for their clearness as mordant colors and their excellent fastness to potting and very good fastness to steaming. Their fastness to washing and milling alongside white wool and cotton is also very good. They are dyed with an addition of Glauber's salt, acetic acid and sulphuric acid, and are aftertreated with bichrome. Naphtylamine Black C S B and Naphtylamine Black C S R are dyed direct with an addition of sulphuric acid and Glauber's salt or bisulphate of soda, giving good level results and penetrating well. As a rule these blacks are used for dyeing ladies' dress material and, in certain cases for cheap suitings, as well as

for zephyr, worsted, and woolen yarns which are not intended for goods required to stand milling. They are also well adapted for carbonized material. White cotton effects in woolen pieces are not tinged. Monochrome Brown 3G is used for the production of fast brown shades on loose wool, slubbing, knitting and woolen yarns, as well as for gentlemen's suitings. It is dyed direct with an addition of bichrome. When working on a chrome mordant or aftertreating with chrome, the shade turns out redder. The shades are especially distinguished for their very good fastness to alkali, washing, milling and light. Quinoline Yellow K T extra concentrated is well adapted for dyeing tin-weighted silks. It is also used on wool, being chiefly employed as a yellow constituent for mode shades. It is very serviceable also for direct printing on wool, wool-silk and silk. Cotton effects are not tinged.

CELL DRIER MACHINE CO., Taunton, Mass., has recently issued a bulletin describing and illustrating a few of the cell driers which have been built and installed within the past year. One of the cell driers illustrated and described is believed by the maker to have the greatest capacity of any textile drier of the same width ever built. Some comparisons between the two systems of the cell drier and the cylinder drier are made in the bulletin, which are of interest, as these two types may be said to be in competition. A copy of this bulletin may be obtained by addressing the home office of the company.

RHODE ISLAND HUMIDIFIER AND VENTILATING CO., 19 Calender St., Providence, R. I., has recently issued a leaflet entitled "The James Kelly System of Humidification," which describes and points out the advantages of this system of humidification. A list of cotton mills in which this system is installed is also given.

THE VACUUM VENTILATOR CO., 82 Purchase St., Boston, Mass., has described and illustrated its "Vacuum" ventilator in an interesting ten-page booklet, in which it is stated that the ventilator is proof against storms and downdraughts, a strong up-draught being maintained whichever way the wind blows. It is claimed to be the simplest, most scientific and satisfactory ventilator on the market. There are no mechanical parts to swing or rotate in the wind. Other claims of advantage are also set forth in the pamphlet. A copy may be obtained by addressing the Boston office.

THE AMERICAN MOISTENING CO., 79 Milk St., Boston, Mass., has recently issued in booklet form a list of over 800 users of its system of humidifiers to April 1, 1910. This list includes some of the largest mills in the country, and is an interesting compilation. A number of views of the Comins Sectional Humidifier are also given in the booklet.

CASSELLA COLOR CO., New York City, in its May issue of "Dyestuffs" published several interesting articles, among which may be mentioned "Dyeing of Immedial Colors in the Padding Machine," "Union Dyeing," "Preparation, Dyeing and Finishing of Ladies' Cloth," etc. All dyers should be on the mailing list of the Cassella Color Co., and receive a copy of "Dyestuffs" monthly.

BERLIN ANILINE WORKS, 215 Water St., New York City, have recently issued a color sheet describing their Brilliant Copper Blue GW & BW pat. and Brilliant Congo Blue 2RW pat., which are suitable for all kinds of vegetable fibers, such as cotton, linen, ramie, jute, artificial silk, etc. They are also adapted for dyeing union material in a neutral Glaubersalt bath. In a soap bath these new dyes only slightly stain the silk, and are therefore of interest for half-silk dyeing.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J., in its June issue of "Graphite," gives some very interesting items and many illustrations showing the various uses of Dixon's Silica-Graphite Paint. A very interesting illustration is the American Woolen Company's building during the course of erection in New York City. The building will be nineteen stories of structural steel construction and will be painted with Dixon's Silica-Graphite Paint.

WESTERN ELECTRIC CO., New York City, has just issued its bulletin No. 5533, describing "Hawthorn Series Incandescent Lighting System with Sunbeam Mazda Lamps." This bulletin gives details of and operating data for lamps and constant current transformers suitable for use on series lighting circuits. It lists standard switchboard panels for controlling lighting circuits, and pole brackets, hoods and reflectors for use in the construction of these circuits. This bulletin also describes and lists the standard porcelain series socket with automatic cut-out, which becomes effective in case any particular lamp becomes damaged.

A new device brought to notice in this bulletin is the safety automatic cut-out, a device for protecting series street lighting circuits in case any portion becomes ruptured. This bulletin as a whole gives valuable information and sufficient data for use in laying out series circuits for lighting suburban or residential districts.

THE LAGONDA MFG. CO., Springfield, Ohio, announces that the demand for their Weinland boiler tube cleaners has been so great that they have been forced to increase the size of their plant. They have accordingly added a new wing, very nearly as large as half of their former plant. This new building is of concrete construction with slate roof, well lighted and ventilated. The stock and tool rooms have been removed from the old plant into the new addition, and the space formerly occupied by these departments equipped with new automatic machine tools which will enable them to meet the increased demand for their products and to give prompt deliveries. The Lagonda Mfg. Co. report that they have for the last six months been running night and day in order to keep up with their orders.

The Bellicosa softener, recently put on the market by the ARABOL MFG. CO., 100 William Street, New York City, comes in powder form. This has a double advantage, one of which is that the freight is less, since there is no water in it to add weight. The other point gained is of particular value in summer; Bellicosa enables the manufacturer to prepare only as much as is needed for any particular run, and thus no material goes to waste by souring. It is said to be highly recommended by bleachers, printers and dyers who have given it a practical test.

THE CORLEY TEXTILE SPECIALTY CO., Atlanta, Ga., has been incorporated by Clifton Corley and others with a capital stock of $20,000 to manufacture textile appliances.

THE CURRIER NEEDLE CO., is the new name of the Dodge Needle Company, Manchester, N. H. Mr. Dodge retired from the firm some time ago and Mr. Currier is now secretary and treasurer of the company. He has been with the concern since 1895 and is well known throughout the knit goods field. George A. Leighton, Pres. of the Leighton Machine Co., will continue at the head of the Currier Needle Co. Mr. Leighton is erecting a new building which will be occupied by both companies in the Fall,

"STA-WHITE"

A high gloss white paint for the interior of spinning and weaving rooms in textile mills. It will lighten the rooms at least 33⅓ %, which means better work and more of it. Washable and sanitary. Write for booklet and sample on wood, which will give the true finish of the paint.

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J. H. MAYES,
SOUTHERN AGENT,
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and will give then larger facilities for their increasing business.

J. J. MCNALLY, Norfolk, Va., is the patentee of a pneumatic cotton gin. The McNally Pneumatic Cotton Gin Corporation has been organized and capitalized at $2,000,000. Indications now point that this company will erect a plant at Columbia, S. C., for the manufacture of these cotton gins.

WELD & NEVILLE, New York City, and STEPHEN M. WELD & CO., New York City, announce that R. C. Cairnes severed his connection with those firms on June 30th. The remaining partners in each firm will carry on the business as heretofore.

THE SACO-PETTEE CO., recently incorporated in Massachusetts with a capital stock of $1,600,000, has taken over the business of the Saco & Pettee Machine Shops of Newton Upper Falls, Mass. This action was ratified by the stockholders at a meeting on June 2nd. Stockholders of the old company will receive two shares of the stock of the newly organized company for every one of the old stock held by them. The officers of the company remain the same, and no material change in its affairs have been made.

F. LIVINGSTON & CO., Ltd., Manchester, England, dealers in cotton, cotton waste of all descriptions, have done business with the mills of the United States for many years, and are well known in the cotton waste trade, and among Southern dealers in linters. F. Livingston, the director of the company, visits the United States yearly in the Fall, looking after the business of the firm.

CROCKER-WHEELER CO., Ampere, N. J., announce that they have changed the address of their Boston office from 4 Post Office Square to the Boston Safe Deposit and Trust Co. Bldg., Devonshire and Arch Sts.

SCANDANAVIA BELTING CO., 223 Fourth Ave., Pittsburg, Pa., has issued an illustrated booklet on Scandanavia Belting, showing the many uses to which it is put, and its resistance to wear under most trying conditions. Scandanavia belting, which is made from the finest grade of cotton grown in the United States, is said to be more durable than even the best of leather; and runs steadier and truer, transmitting the power without vibration. Dampness, steam and even running it in water, do not affect it. It does not slip when wet and is not damaged by oil or grease. Besides being largely used in dyehouses and bleacheries, it is also used for conveying and elevating purposes. Copy of this booklet may be obtained by addressing the Pittsburgh office.

MILL NEWS.

Notices of mill projects, additions or improvements are solicited for this department.

Alabama.

CUBA. L. Poole is, according to reports, interested in a plan to establish a hosiery knitting mill, to be driven by water power.

RAGLAND. W. L. Brown is reported to be planning the establishment of a company to build a $250,000 cotton mill.

ROANOKE. W. A. Handley Mfg. Co., according to reports, will build an addition to the mill and install 120 broad looms. The present equipment consists of 18,000 ring spindles.

Delaware.

WILMINGTON. Joseph Bancroft & Co. will increase their capital stock from $3,000,000 to $5,000,000.

Georgia.

COLUMBUS. Meritas Mills, recently incorporated with a capital stock of $300,000 to build a mill with 10,000 spindles and 170 looms, have awarded contract to T. C. Thompson & Bro., Birmingham, Ala., for the erection of the mill buildings. The main building will be two stories high, of brick construction with a sawtooth roof. Electric power will be used.

LAGRANGE. Unity Cotton Mills, according to reports, will build an addition to the mill, in which balling and winding machinery will be installed.

MANCHESTER. Manchester Cotton Mills are planning to build an addition to the mill and install broad looms. The present equipment consists of 20,600 ring spindles and 450 broad looms.

RACCOON. Berryton Mills have been incorporated with a capital stock of $150,000 by Jno. M. Berry, H. R. Berry and others of Rome, Ga. The company takes over the Raccoon Mills property, including the mill buildings and equipment, 630 acres of land, 56 cottages, etc. Extensive improvements to the amount of $80,000 will be made, and knitting machines will be installed which will give the plant a daily capacity of 1,200 pairs of women's hosiery, etc. About 5,000 spindles will also be installed. Jno. M. Berry is also president of the Rome Hosiery Mills.

Kentucky.

LOUISVILLE. Puritan Cordage Mills will hold a meeting on July 5 for the purpose of increasing their capital stock from $75,000 to $150,000. It is proposed to use the additional stock in increasing the capacity of the plant.

Massachusetts.

BOSTON. Berkshire Woolen & Worsted Co. has been incorporated with a capital stock of $400,000, to manufacture woolen and worsted goods. The officers are Ralph D. Gillett, Westfield, Mass., Pres., and James R. Savery, Pittsfield, Mass., Treas.

LAWRENCE. Pacific Mills have just awarded contract for the reinforced concrete floors to be used in the additions now under construction. The contract calls for nearly 16 acres of concrete floor construction.

LAWRENCE. Whitman Yarn Mill, to be erected in South Lawrence, has awarded contract for the buildings to B. F. Smith & Co., Pawtucket, R. I. The contract calls for completion of the mill by January, 1911.

LOWELL. Bigelow Carpet Co. has awarded contract for the fans, vapor disposal and ventilating system in the new dye house.

NORTH ADAMS. W. C. Plunkett & Sons are reported to have

under consideration a plan for erecting another mill at this place. Details are not available.

Missouri.

ST. LOUIS. Holbrook-Blackwelder Co. is reported to be in correspondence with C. C. Meadow, Boston, Mass., with a view to building a large cotton mill at this place.

New Jersey.

PATERSON. J. Edward Barbour will, according to reports, begin the erection of a large linen thread mill at Fairview, N. J., in the near future.

VINELAND. Fowler Waste Mfg. Co. has removed its entire plant from Philadelphia to this place and will soon be in operation. The company still maintains an office in Philadelphia.

New York.

COHOES. Cohoes Co. At a recent meeting, the stockholders voted to increase the capital stock from $600,000 to $1,500,000, the increased capital to be used in new construction work, including the changing from water power to electric power.

DRYDEN. Dryden Blanket Co. of this place is advertised for sale. The property consists of a three-story stone mill, large warehouse, office building, and machinery consisting of 9 broad looms, 2 sets of cards and the necessary spinning and finishing machinery; also engines and boilers.

UTICA. Marshall Knitting Company has been incorporated with a capital stock of $50,000 by Clifton C. Newell, Oriskany, N. Y., Jno. P. Libby, and Gilbert Butler of Utica.

North Carolina.

SALISBURY. Gilbert F. Hambrey is planning the establishment of a damask mill equipped with 50 looms.

ALBEMARLE. The Efird Mfg. Co. has increased its capital stock from $200,000 to $500,000. This concern manufactures yarns.

BURLINGTON. Keystone Finishing Mills Co., recently organized for finishing hosiery, will erect a building 60x120 ft., and will install machinery for finishing 2,000 dozen pairs of hosiery daily.

CONCORD. Roberta Mfg. Co. has been incorporated with a capital stock of $100,000 by T. M. Keller of Concord, Jno. C. Rankin and S. M. Robinson, Lowell, N. C., and R. E. Mason and J. H. McAden, Charlotte, N. C. The company will build a cotton mill.

DURHAM. Durham Hosiery Mills will, according to report, increase their capital stock from $350,000 to $1,000,000. The chain of mills Nos. 1, 2, 3, 4 and 5 are located at Durham, Chapel Hill, Goldsboro and High Point, N. C., employing about 2,000 operatives. The mills are owned by Gen. Julian S. Carr and his sons.

DURHAM. Durham Textile Mills with a capital stock $2,500 and equipped with 10 hosiery machines, will double their capital stock and purchase 10 additional knitting machines.

DURHAM. Golden Belt Mfg. Co. has awarded contract for the erection of an addition to the bag mill to Salmon & Salmon, Durham, N. C. The contract calls for a building 75x120 ft., three stories high, of mill construction, to cost $30,000.

ELIZABETH CITY. J. Q. Wood, O. L. McMullan, L. F. Blade and D. M. Jones are reported to be interested in the organization of a company to build a hosiery knitting mill. The capital stock is to be between $40,000 and $50,000.

ENFIELD. Enfield Hosiery Mills Co. has been incorporated with a capital stock of $100,000, the company having been established for some time and producing hose for children. The present daily capacity of the plant of 750 dozen pairs will be doubled when the proposed addition to the mill is made. The additional output will be half hose and ladies' hose. The officers are R. H. Ricks, Rocky Mount, N. C., Pres.; Geo. B. Curtis, Vice-Pres., and Geo. D. Andrews, Sec., Treas., Gen. Mgr.

LUMBERTON. Jennings Cotton Mill has selected J. E. Sirrine, Greenville, S. C., as the architect-engineer in charge of the building to be erected, which will be 131x463 ft., one story, brick construction. About 8,000 spindles for manufacturing hosiery yarns will be installed. Steam power will be used.

MARION. Marion Mfg. Co. has just been started up, and the entire plant is now in operation. The company was organized last year with D. D. Little, Salisbury, N. C., Pres. The capital stock of the company is $500,000 and the equipment consists of 12,500 spindles and 300 looms to produce wide print cloths. S. L. Copeland is Sec., and Hugh F. Little, Supt.

MAYODAN. Mayo Mills have increased their capital stock from $300,000 to $1,000,000. The present equipment consists of 31,640 mule spindles.

WADESBORO. Geo. Singleton, of Paterson, N. J., will, according to report, move his silk mill from Paterson to this city. The mill will employ about 200 operatives.

Oklahoma.

OKLAHOMA CITY. Oklahoma Bag & Cotton Mills have been incorporated with a capital stock of $1,000,000 by M. L. Berry, Oklahoma City, Jno. T. Woodside and W. L. Gassaway, Greenville, S. C., R. G. Gaines, Central, S. C., and F. D. Ross, Lawton, Okla. The mills will spin yarns, weave bag cloth, manufacture bags and bleach, finish and print the output. The buildings to be erected will include a cotton mill 79x450 ft. two stories high; a bag mill one story high 75x300 ft.; power house 50x140 ft. one story high; and 100 cottages for the operatives. A 3,000,000-gallon water reservoir will also be constructed. The equipment will consist of 10,000 spindles and 300 looms. The bleaching and printing plants will have a capacity of 50,000 yards a day. A contract has been made with the Millwood Development Co., which recently acquired possession of 1,600 acres of land, to develop the mill village.

Pennsylvania.

CHESTER. Aberfoyle Mfg. Co. has purchased eight acres of land along the Delaware River and will erect a large wharf. This property is adjacent to its present property.

Rhode Island.

ESMOND. Esmond Mills will increase the capacity of their plant by 25 per cent. by adding 6 sets of cards and new spinning machinery and looms. A large part of the equipment will be imported from Germany. The total capacity of the plant when the additions are completed will be 1,300,000 cotton blankets a year.

WOONSOCKET. Woonsocket Worsted Mills are building an addition 80x50 ft., three stories high, in which spinning machinery will be installed.

South Carolina.

ABBEVILLE. J. Allen Smith, Pres. of the National Bank of Abbeville, is interested in the organization of a company to build a cotton mill. It is reported that a subscription list of $100,000 has been made and that work will be started on the mill building at an early date.

AIKEN. The Carolina Mfg. Co., recently incorporated with a capital stock of $10,000 by W. H. Hite and others, will build a plant for manufacturing hosiery, boxes, etc., the plant to be operated by water and electric power.

CATEECHEE. Norris Cotton Mills Co., according to reports, will install 234 automatic looms to replace the plain looms at present in operation.

CHESTER. Wylie Mills will double their present capital stock of $150,000 and build an addition to the mill, to be equipped with looms. Present equipment consists of 20,160 ring spindles.

FINGERVILLE. Fingerville Mfg. Co., which was recently purchased by Jas. E. Mitchell & Co., Philadelphia, Pa., will be reorganized and put into operation. The company's property includes mill buildings, 12,000 spindles, seven cotton warehouses, 53 cottages, etc.

FLORENCE. Florence Mfg. Co. has been incorporated with capital stock of $200,000 by J. Willard Ragsdale, Jno. L. Barringer and E. M. Matthews, of Florence, and Chas. A. Smith, Timmonsville, S. C. The company will build a cotton mill.

FOUNTAIN INN. John T. Woodside, Greenville, S. C., and the Fountain Inn Mfg. Co. are interested in a plan to build a cotton mill to be equipped with 10,000 spindles and 300 looms at this place.

LANDO. Manetta Mills will add 40 looms to the present equipment of 256 looms. The mill is equipped with 18,100 ring spindles.

LIBERTY. Calumet Mfg. Co. will build an addition 87x104 ft., two stories high, to be equipped with 200 looms. For this purpose the capital stock of $78,200 will be doubled. Present equipment of the plant consists of 8,200 ring spindles. Steam power is used.

LOCKHART. Lockhart Mills, having completed the additional building, are now installing the new machinery. The new equipment, consisting of 6,000 ring spindles and preparatory machinery, was purchased from the Saco-Pettee Co., Biddeford, Me., and is now being installed, and will enable the mill to spin yarns for the production of print cloth in the No. 1 mill. About 200 h.p. will be required to drive the machinery in the new addition.

MONTMORENCI. Hallman Knitting Mill Co., reported last month as having been incorporated with a capital stock of $10,000, will install 30 knitting machines and have a daily output of 100 dozen pairs of hosiery. The company is ready for bids for the knitting machines. The officers are C. E. Hallman, Pres., and Mrs. Lucy W. Moore, Sec.

SIMPSONVILLE. Simpsonville Cotton Mills have increased their capital stock from $150,000 to $500,000, and will build an additional mill to be 134x300 ft. two stories high. The additional equipment will consist of 16,000 spindles and 400 looms. The present equipment is 8,000 spindles and 200 looms, producing print cloth and sheeting.

SUMTER. Sumter Cotton Mills were sold at a master's sale to R. I. Manning representing the bondholders for $21,655. The mill has been operated by a lessee until six months ago when it expired.

WILLIAMSTON. Williamston Mills plan the erection of an addition to the present plant which when completed and equipped will double the capacity of the plant with its present equipment of 32,256 spindles and 816 looms.

WILLIAMSTON. Jno. A. Hudgens, Pelzer, S. C., and parties